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Soil Building and Summer Fertilizers==1926

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By Bayard F. Floyd, Wilson & Toomer Fertilizer Company

One of the most important conditions that influence the fertilizing of citrus trees is that of soil conditions. In discussing summer grove practices, the author feels that he would be lax in his duty by failing to place greatest emphasis upon this one condition. The great need of most citrus groves on sandy lands is more humus and organic matter in the soil. Where other conditions are good, the lack of it prevents obtaining the best type of growth in the trees, the maximum yields and the best quality in the fruits.

In many groves, a good cover crop is grown during the summer season, but active and thorough cultivation during the remainder of the year "burns" or destroys much of it, so that at the end of the year the actual accumulation is small.

Soil building must be a gradual one. There is a certain condition of balance in the soil that is destroyed when excessive amounts of organic material are added at one time and some temporary injury may follow. This is particularly true on the loose, sandy soils of Florida; but repeated and consistent additions of these materials to give a good margin of accumulation each year will bring the desired results.

In California, it is a practice to grow two cover crops during the year and turn them under. In addition, quantities of bean hay, alfalfa hay and other organic matter are brought and broadcasted over the land to be worked into the soil.

There has been a sharp increase in value of city properties in Florida that is out of proportion to the increase in values of farm and grove properties. The value of a grove property is largely dependent upon the returns that can be obtained from that property. Before Florida citrus groves can double in value, the amount of fruit that can be borne by the individual tree must be largely increased, and the quality of the fruit bettered. This can be done only by more intensive culture and better care, which includes providing better soil conditions for the growth of the trees.

Soil

The soil is a complex mass in which chemical and life changes are constantly taking place. Practically all citrus in Florida is grown upon various grades of sandy loam soil. There is a small acreage grown upon the muck lands, and more on the marl and rocky lands of Dade County and elsewhere.

The sandy loam soil consists of innumerable grains of sand, the spaces between which are partially filled with organic matter, both dead and living. The dead matter is plant and animal parts in various stages of decay; the living matter includes fungi, bacteria, various forms of animal life and the roots of living plants. Included with this, between or surrounding the grains of sand, is moisture with various amounts of mineral matter, both solid and in solution, such as clay, phosphates, potash, lime,, iron and other such substances as well as air and other gases.

The colors of the sandy loam soils in Florida are the various shades of yellow, grey and black. The yellowish color is given by iron compounds in and coating the soil particles. The shades of grey and black are due to the organic substances in the soil. The darker shades contain the largest percentages of these materials.

All of the materials that go to make up the soil react on each other and in so doing affect the conditions for plant growth to such an extent that certain definite proportions must be maintained for successful tree and crop production.

The richer soils are those containing the larger percentages of organic material. The sandy soils containing the lesser amounts are the poorer soils. The latter hold less moisture, require more fertilizer and leach badly.

The organic matter in the soil is in all stages of decomposition, from the freshly added material to that in which decay has been more or less complete. The latter material is classed as humus. In the process of decay, many organic compounds are formed. Some are broken down into more simple compounds. and others are built up into more complex com-

pounds. These compounds are numerous and varied and are constantly changing under the various biological moisture and temperature conditions that exist in the soil.

The organisms, such as bacteria, fungi, low animal forms and others, play a very important part in these changes. A rich, mellow soil has a very high content of these organisms. A thin, sandy soil has them present in greatly reduced numbers.

If a condition occurs so that these organisms are killed off and their numbers are greatly reduced, the soil becomes a poor one and plants grow with difficulty in it. Land that lacks drainage usually has a low content of the organisms, and requires aeration and sometimes inoculation. When the conditions in such soils are made right by cultivation, aeration and sometimes inoculation and other means, the proper organisms multiply fast and the soil becomes a fertile one.

Where excessive cultivation is practiced on some soils, it is said to burn out the land. What really happens is that the soil organisms are stimulated to greater activity by the increased and continued aeration, and the work of these coupled with oxidation, uses up the supply of organic matter in the soil upon which the organisms live and thrive. They then die off from starvation. When their numbers are sufficiently reduced, the conditions become such that they are not congenial for root and plant growth and the plants show injury.

The addition of lime to light sandy soils lacking in organic matter brings about the same condition, and citrus trees on such lands show pronounced Frenching and other evidence of injury. Such lands are quickest and best brought back into good condition by the addition of organic matter to the land and by the inoculution of the soil with stable manure.

Stable manure is very rich in the organisms that the soil require. The addition of this material in amounts far less than what will add any appreciable amount of actual plant food to the sandy soil, will cause sharp growth response in the trees due to the action of the organisms.

The keeping of fewer animals on the farm has considerably decreased the suply of this material under that of former years. The demand is much in excess of the supply. The great need of agriculture in Florida is more of this material. It is likely that an artificial manure will be developed in the future, that will take the place of that made on the farm. In fact some such material is now being made and used in England by composting organic matter which has been inoculated with cultures of these organisms. The farmer or grower can at present considerably increase his supply of manure by composting the manure with hay and other plant materials.

Cover Crops

Citrus trees do best on the lands that have been properly built up by the addition of organic matter to the soil by either planted or volunteer crops. Some of the best fruit is produced on the hammock soils that are well supplied with humus and organic matter and in which the process of decay go on normally and more or less continously. There are few grove soils on the high pine lands that have at all as great an organic content as they should have for the best behavior of the trees.

The products formed by the decay of organic matter in the soil are the most valuable for tree growth and soil improvement. The addition of organic matter that has passed through the various stages of decay, such as muck, is not at all so good because the trees miss the direct and indirect benefits derived from the products of decay. Therefore, the growth of cover crops to be turned under and the spread of material that will decay, are the best soil building practices.

The summer season is the proper time to grow the crops that build up the land. When the first summer rains come in May or early June, all cultivation is stopped excepting perhaps a narrow strip on each side of young trees, and the planted or volunteer crop in the middles is allowed to grow. In late August or early September, the crop is cut and allowed to lie where it falls. The only exception is where some particular spot in the grove has a very sparse growth. In this case, it is sometimes practical to rake the hay from places having the heaviest growth on to the spots with the sparse growth, to help build up these areas.

The usual crops for soil building in citrus groves are velvet beans, cow peas, beggarweed and crotolaria. Natal hay or any grass or weeds, is valuable but not so much so as legumes which add ammonia to the soil.

Velvet Beans are planted more commonly between young trees. They may be planted either three rows to the middle with a planter or broadcasted. Where planted in rows, it is helpful to add a little corn with the beans in planting to provide a support for them to grow upon. They should be planted in March or April. Some plantings made in May do fairly well, but frequently fail to make sufficient growth.

The best varieties to plant are the Florida Velvet Bean and the White Chinese. The Early Speckled is a good variety for some sections but does not make the quantity of vine growth as does the Florida Bean. The Florida Bean should be planted early as it is a long season crop.

Good crops of velvet beans grown during two or three successive seasons on the land between young trees and turned under will put the soil in good condition, and allow better growth and earlier fruiting of the trees.

Cow Peas make a good cover crop for either young or old trees. They are planted more often by broadcasting one to one and a half bushels to each acre, in May just before the last cultivation. They are sometimes planted in rows, three to five to each middle. The Brabham variety is a good variety to plant.

Beggarweed makes a permanent cover crop, and is preferable because once the land is well seeded, it will appear as a volunteer crop each year afterward if handled properly. Cultivation should be practiced with care in the early summer after the first rains to avoid killing the young seedlings that come up at that time.

The crop should be cut in August and a second crop allowed to grow from the stubble. It makes an excellent hay but should be left on the land to act as a soil builder. The crop should be planted just previous to the last cultivation in the spring.

Crotolaria shows promise of being a very good cover crop particularly on the lighter lands where other crops grow with difficulty. It will reseed itself if handled properly. For full information concerning this crop and where to obtain the seed, write the Agricultural Experiment Station at Gainesville, Florida.

Soil Fertility

The building up of the soil with organic matter is very important but alone is not sufficient, for the growing of commercial crops. The soil must also be fertilized. However, land well supplied with organic matter does not require so much fertilizer and can use a different type of fertilizer from that used on the thinner lands.

The food elements that are lacking in Florida soils are ammonia, phosphoric acid, and potash. Hilgard states that soils which contain less than 0.1 of one per cent of either of these elements may be regarded as having a deficiency of that particular substance. The food content of virgin Florida soils is exceedingly low. The average potash content is

less than 0.01 of one per cent. The amounts of ammonia and phosphoric acid and of other necessary elements are so low that it seems almost inconceivable that such soil can support the amount of native vegetation that it does.

The following are some chemical analyses of various soil types in Florida:

	N	P205	K20
	Per Ct.	Per Ct.	Per Ct
High Pine Land	0.0350	0.0032	0.0077
Flatwoods	.0490	.0096	.0073
Rocky Land, Dade Co.	.0182	.0256	.0178
Light Hammock	.0150	.0900	.0420

In the growing of citrus trees and other crops on Florida soils, commercial fertilizers which are mixtures of materials that contain ammonia (nitrogen), phosphoric acid and potash, are generally added to the soil to supply the deficiency in these elements. The character of the materials put in the mixture depends upon the crop to be grown.

Ammonia. For citrus trees some mixtures have the ammonia (or nitrogen) carried partly in mineral forms such as nitrate of soda or sulphate of ammonia, and partly in organic forms such as dried blood, bone, guano, tobacco stems, goat and sheep manure, castor pomace or other such materials. Other mixtures carry the ammonia entirely in mineral forms, but only a few have it in an organic form only.

Mixtures for the summer application have a larger percentage of the ammonia in the organic forms because the conditions in the soil for decay are much better during that season, enabling the plants to obtain the locked up food; and since the decay is a gradual one, less of the food element is lost from the leaching effect of the summer rains.

The organic ammoniates are not so necessary on the soils that are richer in humus and organic matter, because these materials absorb and and hold the mineral sources and prevent rapid leaching.

Phosphoric Acid is carried in the mixtures as superphosphate or some form of bone. Mixtures containing more or less bone are popular, particularly for use in the summer season, largely on account of the organic forms of ammonia which the bone carries.

The work of the Agricultural Experiment Station at Gainesville and years of experience in the groves in Florida have shown that superphosphate is the cheapest and best form of phosphoric acid to use. It leaches very little and provides a source that it available to the plant at all seasons and under all conditions.

Potash is carried in the fertilizer mixtures largely as High Grade Sulphate of Potash. Sometimes the Low Grade Sulphate of Potash and tobacco stems or some other ammoniate that contains some potash are used in part.

Fertilizers For Young Trees

For young trees that are not in bearing, the work is largely that of expansion. The effort of the tree is to build a frame work upon which will be borne later successions of growth that make and carry the fruit. Increased leaf surface is needed to provide the machinery for manufacturing the food needed for its building work.

The character of fertilizers to be used for these trees is somewhat different from those used for bearing trees. More ammonia and less potash is contained in the mixtures. Plenty of readily available sources are used so that the tree may have the quantity of available food which it needs at all times for its work. In order to avoid rank and sappy growth, the formulas are well balanced with phosphoric acid and potash. On the other hand, an excess of these elements in proportion to ammonia, gives growth that is too slow and may have more or less of a stunting effect. For young trees in normal condition, 3 per cent of ammonia is a good proportion for mixtures to be used during the summer season; 8 per cent phosphoric acid and 5 per cent potash are sufficient to give a well balanced mixture.

Fertilizers for Fruit Production

Fruit texture is determined very largely by rate and amount of growth in the tree and fruit. The food elements and soil moisture are contributing factors. The summer and the fall applications of fertilizer have much influence upon the development of the fruit.

Rapid and extensive growth in the tree is likely to cause rapid growth in the fruit, which in turn makes a coarse, thick rind. Fruit on young trees is often poor in texture and oversized on account of strong growth in the tree. The fruit on trees with light crops is frequently coarse and oversized if the trees are at all vigorous. Growth extremes caused by irregular food and moisture conditions in the soil tend to make fruit of poor quality.

Slow, even growth is most likely to give the smooth texture and thin skinned fruit that is so much desired. The control of growth is not always easy but conditions can be provided whereby the favorable type of growth is most likely to occur. First, this type is most likely on soils well supplied with humus and organic matter and that are not too loose and open. Second, the fertilizer mixtures used should be applied in amount and be be made up of percentages and sources that will give the tree the food it needs but not in excessive amounts at any tme. The character of such mixtures is determined very largely by the soil conditions and the amount of moisture that is likely to be present during the season.

Three per cent of ammonia is an average percentage on the sandy lands, that are in a normal and healthy condition. If the trees are exceptionally vigorous, 2 per cent ammonia may be sufficient; but if they are backward and need pushing 4 per cent, and perhaps 5 per cent ammonia may be best.

The phosphoric acid content is determined very largely by the character of the mixture, more or less being used according as experience has shown that the mixture needs to be balanced. The average mixture for the summer application contains 8 per cent available phosphoric acid or 10 per cent to 12 per cent of total phosphoric acid if an all-bone mixture. The effect of the phosphoric acid upon growth is more or less of an indirect one and its effects are not so easily seen in the tree. It contributes to early maturity and to some extent to the eating quality of the fruit.

The summer formulas for bearing trees nearly always run fairly high in potash, 8 per cent and 10 per cent being the more usual. The potash helps to make even growth and contributes directly to the making of good eating quality in the fruit. It helps in the translocation and storage of the sugars and balances the effect of ammonia, making firm growth that gives good shipping quality to the fruit.

Other Grove Practices for Summer

Cultivation on the sandy lands should be stopped at the beginning of the summer rains. A cover crop should be planted or the volunteer crop allowed to grow.

Mow the cover crop in the groves on both sandy and hammock lands at least once during mid-summer, and particularly around September first to prevent plant bug infestation. Do not remove the cover crop for hay unless assured that the land does not need it the worst.

Prune the dead and weak wood and water sprouts from the trees. Help for this work can best be spared during the summer season. Remember, a good pruning is just as necessary to the tree as a bath is to a man, and the tree will show its appreciation by brighter, cleaner and more vigorous growth. Make smooth cuts and leave

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Good Grove Practice

By G. D. Sloan, Assistant Manager, The Gulf Fertilizer Company

Florida is just waking up to the real value of her land and especially to citrus groves. It has long been known that California groves producing no more fruit of not near the quality brought more per acre on the market than the Florida grove. This notwithstanding the fact that it cost a great deal more per acre to raise a grove in California than it does in Florida. Florida has more than 260,000 acres in oranges, grapefruit and tangerines. This is divided into some 30,500 properties containing more than 11,000,000 bearing and 7,000,000 non bearing trees; the bearing trees producing an average of about two boxes per tree. In 33 counties there is more than 22,250,000 acres, the smallest of which contains approximately 187,000 acres, or just about 70,000 acres less than our total acreage in groves. It is safe to say that we have at least 5,000,000 acres more in these counties which are adapted to the production of citrus.

It does not seem advisable at the present time to increase our acreage in citrus to any great extent, since only about two-thirds of our present acreage is in bearing and with our present planting, a large crop very often brings unsatisfactory prices. When we consider, however, that the present production of oranges in Florida and California will only furnish one orange to each person in the United States every six days and four grapefruit per capita per annum, it would seem that there are great possibilities for increased production. It is estimated that less than 10 per cent of the people in the United States are consuming citrus fruit. It would seem, therefore, that our problems lie in marketing and distribution rather than in the curtailment of the industry.

At the present time we have two major problems confronting us: first, that of marketing and distribution and second, the matter of producing quality fruit. The grower who produces other than quality fruit can only hope to get satisfactory price when there is an extreme shortage of his product. Of course, some growers will say that it does not pay to produce quality fruit and the chances are ten to one that they have spent money unnecessarily in trying to produce high grade fruit. Some growers will spray five or six times during the year in an effort to have bright fruit when possibly three sprayings made at the proper time would have given far better results.

A great deal could be said concerning the marketing and distribution but that is a problem for experts in their line who have had considerable time to devote to the subject, so we will pass that for others more capable of discussing it intelligently and take up the matter of the production of quality fruit.

Of course, every grove is more or less an individual problem requiring individual attention and very often different methods of handling from that of an adjoining property. Trees on rough lemon stock require different attention from those on sour orange stock as do those on high pine land require different attention from those on good hammock soils. The pineapple orange cannot be successfully handled in the same manner in which we would handle our grapefruit. Our idea, therefore, is to discuss the matter in a general way and not in a manner which might be adapted to individual problems.

A few years back the tendency was to produce maximum crops regardless of quailty. In an effort to do this an excessive amount of cultivation was done, especially on the lighter soil, and some groves were overfertilized. The result was heavy crops of very often low quality fruit. During the last few years there has been a tendency in the other direction; that is to produce quality regardless of quantity. This subject might be best discussed under three headings, which are considered by the writer in their importance as follows: First, fertilization, second, spraying and third, cultivation.

Fertilization: Of course, the object of every citrus grower is to produce fruit from which he expects to receive satisfactory returns for the amount of money invested. In order to do this, of course, he must first produce the trees. Our attention for the first five years in the development of a grove, therefore, should be in growing trees, which, after that period, we expect to produce fruit. When we fertilize a young grove we should do so with the idea of producing a satisfactory wood growth. The amounts and analyses to be used depend entirely on the individual grove, but for all general purposes a 4-8-3 for the spring and summer application is a good balanced formula and a 3-8-5 for the fall application. The amounts vary from 1 lb. per tree per application the first year to 5 lbs per tree per application the fourth year. Trees budded to sour orange stock require somewhat more fertilizer than those budded to rough lemon. Tangerines and grapefruit require heavier applications than do the round oranges. If it is possible to do so, it is more desirable to divide the above amounts in to four applications per year instead of three.

The proper fertilization of bearing trees, that is trees from five years up, is much more of a problem than that of fertilization of young trees. Fortunately the citrus tree will stand more abuse in the way of fertilization than almost any other crop grown. That is, a tree can be produced by any of a number of methods in use at the present time, but in order to produce fruit of high quality it is necessary to follow more or less general rules which have been found to be adaptable to this purpose. When a tree reaches its fifth year, we then feel that it should begin to produce fruit enough to at least pay the cost of upkeep, but too often the fruit produced from this age tree is very poor quality and demands a very low price on the market.

Under normal conditions we expect to get our heavy growth in the spring and we fertilize for that purpose. For this application we use more or less chemical formulae, because we usually have very little rainfall during the spring months. It is, therefore, necessary to use a fertilizer which will become available and be taken up by the trees when there is a deficiency of moisture. Organics require considerable moisture to render them soluable and available and, for this reason, they are not used to any great extent in the spring application. We want our spring application to carry as much ammonia as we can safely use, because it is growth produced at this time that we expect to bear our next year's crop and unless we get the growth we cannot expect a crop the following year. Under normal conditions a 4-8-5 formula is preferable for the spring application. This to be made from Nitrate of Soda, Sulphate of Ammonia, Tobacco Stems, Superphosphate, Bone Meal and Sulphate of Potash. This formula should carry not more than one-third of its ammonia from organics; that is Bone

Meal and Tobacco Stems. Under some conditions, however, 4 per cent ammonia cannot safely be used, in which case a 3-8-5 formula made up of the same materials is to be recommended.

It is pretty well established that if we allow our trees to get a little hungry between the summer and fall applications we get a better quality fruit. For this reason it is recommended that our summer application be made earlier. Some years back it was the general practice to make our summer application in June and in some instances even as late as July. Where the application was made this late, it kept the trees in more or less a growing stage throughout the entire period between the summer and fall applications. Best results have been obtained where the summer application was made in May, certainly before the first of June. When made at this time the fertilizer is allowed to become available for the summer growth which is produced more uniform than if applied later.

Because of our excessive amount of moisture during the summer, a fertilizer containing a high percentage of organics is to be recommended. Results obtained from Bone Meal and Peruvian Guano have been so far superior to the results obtained from the use of other organics that they have become practically the standard with the good citrus grower. Contrary to the spring application, our summer application should carry low ammonia, high phosphoric acid and high potash. Of course, the age of the tree will regulate this to a certain extent. We would expect to use more ammonia and less potash on a five year old tree than we would on a twelve or fifteen year old tree. The formulae used vary from a 4-8-8, 3-8-10 to a 2-8-10. The 4 per cent goods is particularly desirable on grapefruit, while the lower ammoniates are more desirable on the round oranges, if conditions are such that will permit their use. For these formulae it is recommended that they be derived from the following sources: Nitrate of Soda, Sulphate of Ammonia, Peruvian Guano. Bone Meal, Superphosphate and Sulphate of Potash with about two-thirds of the ammonia from the bone meal and Peruvian Guano.

Under conditins where high organics are not necessary, brands containing higher phosphoric acid content may be used with good results if not used too often. The tendency of the continual use of high phosphoric acid is to produce a fine quality of early maturing fruit, but of small size, and its use can be carried to the extreme. One application per year, however, preferably made in May, may be used of a 4-10-8, 3-12-10 or 2-12-10, if conditions warrant. These formulae should, of course, carry some organic material in the way of Bone Meal, Goat Manure and possibly Tobacco Stems.

The fall application does not differ materially from that of the summer except that, under normal conditons, as high a percentage of organics is not necessary. Usually a 4-8-8-, 3-8-8 or 3-8-10 made of the the same materials as fertilizers used in the spring application is sufficient: The time of applying this varies from November 1st through December, depending on the condition and location of the grove. Some growers eliminate the fall application. By the writer this is considered the most important of the year. The plant food is taken up by the trees, stored in the plant cells ready to force out a good uniform spring growth and furnish the tree vitality to produce and hold the bloom which comes with the spring growth. Contrary to opinion, this application, if properly balanced, does not force an abnormal winter growth thereby making the trees more susceptible to cold injury. It is felt by some growers that a heavy application at this time has a very detrimental effect on the late fruit. This may be the case under some conditions, but as a general thing if the formula used is well balanced and the spring application not too heavy, there should be no detrimental effects whatsoever.

In summing up the problem of fertilization: First, be sure that you have the proper formula for your conditions. Second, that it is applied at the proper time. Third, that your trees are always supplied with the proper amount of plant food to not only produce a satisfactory crop of good quality fruit, but to produce sufficient growth to bear a crop of fruit the following year.

Spraying: No grove can produce maximum results unless kept comparatively free from injurious insects and diseases. Practically every grove is more or less infested with insects unless it happens to be isolated and, even in those cases, scale is very often found. Spraying has been one of our most expensive operations. In most cases it has been made more expensive than was necessary because the average grower sprayed by the calendar rather than by the stage of the development of the insects. Certainly satisfactory results cannot be obtained if spraying with oil emulsion is omitted until all of the insects become adults. To get a satisfactory control at this time two or three sprayings are necessary when, if done at the proper time, one good spraying will be a great deal more beneficial than three sprayings improperly done at the wrong time. Our largest cause for lack of good insect control has been poor spraying with an unsatisfactory oil emulsion. We do not mean by this that one good spraying will control all pests during the entire year. It may be that at some future time such a spray solution will be made. Up until the present time, however, it has not. Under normal conditions, however, one good spraying with a good oil emulsion is sufficient, except in cases where Bordeaux Oil is used in which case a second application is imperative.

Under average conditions, best results from an oil emulsion spray may be obtained during October. Of course, as said in the preceding paragraph, no spraying can successfully be done by the calendar. Every grower should be equipped with a magnifying glass which will magnify about fourteen times, and watch the development of his insects.

Some years we have very bad scab infection in our grapefruit. Due to the heavy spring rains this has been one of our worst years and in some groves practically the entire grapefruit crop damaged because of scab infection. The spores of the organism causing this disease will produce in a very few hours under favorable conditions and germinate in a very few minutes. This is about the speediest plant disease fungus known. This probably accounts for the erratic behavior of the disease and doubtless explains why the disease is difficult to control under commercial conditions.

A number of various spray materials have been used in an effort to control this disease, but none have proven so satisfactory as Bordeaux Mixture. The proper time to apply this is in the spring before the growth begins.

Bordeaux is also the only spray solution which will successfully control melanose. Under normal conditions the proper time to apply this for satisfactory results is from April 20th to May 5th. This, however, has been an abnormal year and the grower who sprayed by the middle of April is no doubt ahead of the game.

Without exception, Bordeaux should always be used in combination with oil, but the addition of oil should not cause the grower to consider this material as an insecticide, but as a very strong fungicide.

Unfortunately Bordeaux kills all of our friendly fungi as well as our parasitic fungi and for this reason it is always, without exception, necessary to follow its use with an oil emulsion. The proper time to apply this is usually in July and to the grower who does not plan on using the oil emulsion spray following its use, he had better by far not use Bordeaux Mixture.

Lime Sulphur is our standard for rust mite control, whether in the form of Lime Sulphur Solution or dust. Dust is by far more economical so far as applying it is concerned, but for the grower who has a small acreage the solution is no doubt more satisfactory. The solution when applied in the form of a spray is not readily washed off by the heavy rains, while the dust is. Spraying with the solution will control rust mite for a much longer period than will dusting, but about three dustings can be made for the cost of one spraying. Therefore, on the large acreages dusting is to be recommended.

The effectiveness of our spraying depends, first, on the time of application; second, on the quality of material used and, third on the manner it is applied. If spraying is done at the improper time no matter how good a job is done or how good a material is used, satisfactory results cannot be obtained. If it is done with poor quality material at the proper time in an effective manner, satisfactory results cannot be obtained. If it is done at the proper time with good materials in a slipshod manner leaving half of the branches and half of the foliage on the trees untouched, satisfactory results cannot be obtained. The disease or insect must be coated with a good film of the spray solution in order to obtain satisfactory results. If this is not done, the grower is liable to condemn spraying as a whole when as a matter of fact his unsatisfactory results were caused entirely by the poor method in which it was applied.

Cultivation: This topic has been given last place because it is possible with proper fertilization and proper spraying, to produce a very high quality fruit without cultivation. In fact some of our growers are practicing non-cultivation methods altogether. In such cases, however, it is found very necessary to use larger quantities of fertilizer. This method should only be used where a satisfactory moisture content may be maintained without cultivation. This can only be done on very moist soils or with artificial irrigation. It is, however, pretty well established that the least possible cultivation is more desirable in producing quality fruit. On our lighter soils intensive cultivation is almost necessary up and until the beginning of our rainy season, which usually begins the last of May or first of June. After this time it is desirable to discontinue all cultivation on bearing groves until the following fall and let a cover crop grow. This year our heavy spring rains have made intensive cultivation both impossible and unnecessary, but the dry weather we are having following this rain is making it possible and necessary.

A large number of our growers plow their groves and do not realize how deeply they are plowing. The feeding roots in an orange tree are principally in the first seven inches of soil and material damage is done to the trees by disturbing them to any great depth. The idea that some growers have that it is necessary to tear these roots up occasionally is erroneous and this is responsible for considerable trouble in the citrus grove. If it is necessary to plow at all, it should be very shallow and not more often than once a year. If possible to use a tractor with a disk harrow, much more satisfactory work can be done provided the disk is equipped with spools to prevent it going over two or three inches deep.

Some soils require and will stand more cultivation than others, but as aforesaid, the minimum amount of cultivation which will produce maximum results is the most desirable. Constant cultivation of our light sandy soils will decrease our humus content instead of building it up and has a tendency to produce a deadened soil and consequently unsatisfactory trees. Heavy soils will stand more frequent cultivation because of the larger supply of humus present. On our lighter sandy soils more satisfactory results may be obtained by discontinuing cultivation from June 1st to January 15th. Beginning the cultivation as late as January 15th or February 1st does not have the tendency to start the sap flowing to the extent that some suppose. On the other hand, if the practice of beginning the cultivation in early October is followed, the tree is kept in a more or less growing condition all winter and the result is large, coarse fruit. If the tree is not actually growing, the sap is circulating through it and the same results are obtained. This does not apply altogether to trees on sour orange or grapefruit roots, as cultivation during the winter does not seem to have as much influence on their growth as it does where the rough lemon stock is used.

In conclusion, if the following usually obtained satisfactory results. rules are observed the grower will

Don't fertilize too heavily, but intelligently.

Don't use higher percentages of ammonia than your conditions require.

Don't fail to grow a cover crop during the summer after discontinuing the cultivation.

Don't fail to spray at the proper time, using the proper material.

Don't cultivate deep.

Don't cultivate too often.

Don't cultivate during the winter.

RUDOLPH HEROLD OF LEON AWARDED SCHOLARSHIP TO COLLEGE OF AGRICULTURE

Herold, Rudolph

Gainesville, Fla.—Rudolph Herold, a club boy of Miccosukee, Leon County, has been awarded a scholarship to the College of Agriculture of the University of Florida for having secured the largest yield of corn last year from his acre, according to an announcement by R. W. Blacklock, state boys' club agent, here recently. The scholarship, which is valued at $375, is given by the Chilean Nitrate Agencies.

Rudolph produced 71.89 bushels of corn on his acre, using nitrate of soda as the sole source of ammonia in his fertilizers.

PORTO RICO FRESH-FRUIT EXPORTS NOV. 1925-JAN. 1926

"Comercio," a monthly publication outlining business conditions in Porto Rico, February, 1926, issue, gives the following exports of fresh fruit from Porto Rico for the three-month period November, 1925, to January, 1926:

Grapefruit Exports

Nov. 1925	125,887 boxes	$325,965
Dec. 1925	51,506 "	154,462
Jan. 1926	46,122 "	137,683

Orange Exports

Nov. 1925	9,194 boxes	$ 27,897
Dec. 1925	59,948 "	146,668
Jan. 1926	24,085 "	57,274

Pineapple Exports

Nov. 1925	212 crates	$ 14
Dec. 1926	7,853 "	23,559
Jan. 1926	15,717 "	47,154

The true value of a dairy sire is shown by the production records of his daughters. Cow testing associations help to determine the production of dairy cows.

Plan to fight the boll weevil. You may not have to, but it pays to be prepared.

Jubilynn, Citrus Fruit

Random Remarks on the Fertilization of Citrus Trees

By S. C. Inman, Florence Villa

It is an old saying that " an honest confession is good for the soul" so permit me to say, I am undertaking this topic with serious misgivings as to my ability to instruct or amuse.

As the discussion has to do largely with fertilizer, let us in the beginning assume that the grower makes use of the article which is commonly known as commercial fertilizer; and that the formula is correct for meeting the biological requirements of the tree itself, such as to promote and maintain physical well-being and to supply sufficient reserve energy to enable the tree to yield fruit of highest possible quality. In order to do this, it is well to look carefully to sources of supply. Buy of establishments of good "performance records" as we sometimes say of certain strains of fruit.

If you are getting good results from the use of a certain line of feeds, it argues strongly for continuing the use of this particular line, for by so doing you become familiar with it, and eventually will know about what results to look for, conditions being usual. Hence, I would say as a basis of practice, do not be changing your fertilizer continually. "Wild-catting the market" for new things or lower prices gets you nowhere, for it requires more time than many seem to suppose, before a tree is brought fully under the influence of the feed it may have. One application does not accomplish it, and so, you may change from a very good line of feeding to a very poor line, as would be shown by continued use, and yet with the one application it would not be conclusive, though you were rewarded with a good crop of fruit. The tree may be giving the results of accumulated reserve from former feeding. Therefore I advocate the policy of holding to a good thing which you have tested by long continued use.

As this paper has to do more particularly with the use of fertilizers, let us dwell a little on the logical time for applying them. This has been pretty well adopted by most growers and this paragraph may not be necessary, while to others it may prove helpful. And so I am going to "take a look" into the biological processes of the tree. One who is a little observant, does not need to have a very long standing acquaintance with a citrus tree before he will have discovered that its activities, in the way of growth are rather spasmodic. Periods of active growth correlate with active sap movement, and these periods alternate with periods of comparative quiet, and these respective periods come and go with considerable regularity. The trees' annual efforts are divided up into about six alternating cycles, three of growth and three of rest. Now these are very perceptibly modified by climatic and food influences and so, it is logical that our applications of fertilizer should correlate with the trees' natural tendencies. And this is why, in practical management we have become accustomed to make our applications of fertilizer at about certain times of the year.

Now to go into an analysis of these respective cycles of growth and rest we have from about December first to March, the winter period of rest, the longest and most complete of the year. During this time the tree sheds much of its foliage (about one third to a half) so that in course of two or three years nature provides a complete outfitting.

By March the tree takes on new life. There is a very general renewal of foliage and a like general show of short wood growth. The tree's semi-nakedness is again covered, and along with this comes the bloom so that by Easter Sunday madam tree is further adorned with flowers and fragrance galore. All this means a heavy drain upon the resources of the tree and food material is in great demand.

By June first, at least, business is again very quiet within the tree, but the roots and especially the little fibrous rootlets which are always exploring for food for the tree, seem never to have time for rest. And these quiet lulls in the tree above ground give opportunity for gathering an accumulated supply of plant food which they take from the moist earth, and store up in a liquid or pasty form called Plasma, in the root crown and tree trunk, ready to be carried up to where they will be made use of when the next sap movement is on.

The next growths of the tree are quite different to a large degree from the early spring growths for it is not so general over the whole tree, but is characterized by heavier, ranker growths here and there. The tree is entering upon new enterprises in the way of extensions and the laying out of a larger frame work or skeleton, making provision for future minor branches and twigs.

From now on the growth goes on, the lines of demarcation between action and quiet becoming less obvious, but by August activities are somewhat subdued, and a quieter life prevails the remainder of the season The new wood is hardening up, the fruit taking on size and demanding heavier apportionments of food material, until by December quiet prevails and the seasonal cycles of the tree have been completed.

It is during these rest periods that we should apply our contributions to the tree in the way of fertilizer. The applications should precede the anticipated new growth by fully four weeks in order that the soil moisture may have time to reduce the soluble plant food to a water solution, for until then it will not be taken up by the roots.

If you expect to derive best results do not be late in putting down your fertilizer. Too late with your fertilizer may be likened to trying to operate a gas engine with the timing device so adjusted that the igniting spark occurs when the piston head is at the wrong end of the explosion chamber. The fuel is there and used, the explosion takes place, but the power created is allowed to escape through the exhaust valve.

So with your belated application, the material is used, but its energy is out of time with the tree's growing cycle. The sap movement has begun to subside. In other words, the "timer" (You, Mr. Grower), is set too late. You are "out of step" with the tree's natural efforts. This deranges the seasonal cycles and the machinery fails to work smoothly. Try changing your step, and watch for better results.

I am convinced that much fertilizer is practically wasted by careless distribution, putting it down unevenly in handfuls and thus giving an excess in some places and none in others. It should be uniformly ap-

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Oil as insecticide

"Quick Breaking" Oil Emulsions

By W. W. Thomas, California Spray Chemical Co., Orlando

The supreme test of an oil emulsion, for use against scale pests of citrus in Florida, is "Will it Kill RED SCALE and MEALY BUG".

In the matter of oil sprays, development has been along the line of extending the number and range of emulsifying agents and in testing different types of petroleum oils, especially of those oils of high viscosity referred to as lubricating (paraffin) oils. But the method of applying these has been substantially the same, that is in the form of a stable emulsion.

The advent of the quick breaking emulsion recently developed, marks a new era in citrus spraying, here for the first time the insecticidal agent is released to do its work.

There are three constituents necessary to make an oil emulsion, water (continuous phase), oil (dispersed phase) and an emulsifying agent to disperse the oil through the water. When these three constituents are mixed and vigorously agitated the oil is broken up into minute globules, each of which absorbs upon its surface a portion of the emulsifier, and becomes encased or completely locked up in an enclosing membrane or film of this emulsifier, these globules are evenly dispersed throughout the water and are thus prevented by mechanical means from separating out, coalescing and rising to the surface as free oil.

When this type of stable emulsion is sprayed on a citrus tree it does not readily adhere to the leaf surface but gathers in drops here and there, in fact by far the most of it rolls off and is wasted. Even in that which remains, the oil, which is supposed to be the insecticidal agent does not come into contact with the insect, for as previously explained, each minute globule of oil is surrounded by a more or less tough coating of soap (or other emulsifying agent), consequently as the water evaporates it is the soap that first comes into contact with the insect and as this soap is insoluble in oil, it forms a protective covering. As the soap dries it breaks and releases the oil, but the oil is on the outside. Finally, where large drops have gathered on the leaf or fruit, after the soap has decomposed, the oil which is usually of an inferior grade, may cause burning.

The use of a spreader to give a more even coating does not mend matters, but rather aggravates the situation by still further inhibiting the action of the oil, for spreaders being water soluble substances and insoluble in oil, merely spread the water or emulsion as a whole, they are themselves emulsifiers and therefore tend to lock up the oil still more and render it even less available.

In any oil emulsion the greater the amount of emulsifier that is used the smaller the oil droplets become, the less available the oil, and the less insecticidal value it has.

Conversely, the less emulsifier used, the larger the droplets, the more available the oil, the greater the insecticidal value. It has been demonstrated in a carefully conducted series of tests that the insect kill increases as the emulsifier is decreased, other things remaining the same. In reducing the emulsifying agent and hence increasing the size of the oil globules the enclosing membraneous film becomes weaker until it becomes a very easy matter to disrupt them.

Emulsions of this type are called "quick-breaking." They break on being forced through the nozzle of the spray gun and when they hit the surface to be sprayed, the oil by reason of its low surface tension adheres, while the water rolls off. In this case the drip is almost entirely water. Drops may be observed on the leaf surface but these are water only. If these drops are shaken off and the leaf surface be examined it will be seen to be uniformly coated, all over, with a film of pure oil.

In the quick-breaking emulsion the insecticidal agent (oil) is released and becomes immediately available, the entire leaf surface is coated with an oil film, the thickness of which depends upon two factors, the percentage of oil in the emulsion, and the time employed in application, the latter determining the actual number of gallons applied, and consequently the quantity of oil, so that an oil film can be built up by increasing the time factor, other conditions being equal.

As this film is pure oil, it is of supreme importance that the oil be of such a kind as not to injure plant tissue, it is of equal importance that it remain in contact with the insect long enough to kill it, hence it must not evaporate readily. The only type of oil thus far discovered that fulfills these requirements is a very highly refined neutral (saturated) white oil of high visicostity. As far as is now known, this oil, as long as it is neutral, has no more injurious effect on plant tissue than has distilled water, it does not burn and does not destroy plant tissue. During the past year, several thousand acres in Florida have been sprayed, and where efficiently applied, has given excellent results.

The deposit of this oil film, mentioned above, is of the utmost importance from an insecticidal standpoint, for upon this feature depends its efficiency as a scalecide.

When a light volatile oil is used, such as kerosene, it evaporates so quickly that it does not remain in contact with the insect long enough to kill, in a majority of cases. Hence the permanence of the oil film is also a very important factor, and this can be obtained only in an oil of relatively high viscosity.

When this oil film is formed, the insect is subjected to an oil bath from which it cannot escape. The oil gradually penetrates and plugs up the spiracles or breathing tubes and the insect dies from deprivation of oxygen. This process may take several days and as this neutral oil is not "toxic", and does not destroy tissue, there may be no perceptible change in the insect for some time other than an oil-soaked appearance. It follows that inspection for determination of kill should not be made within two weeks after application, but should be delayed for at least a month. Admitting the common objection raised against all sprays as such, that their method of application precludes the possibility of complete coverage, that is, of hitting each separate scale, still there is left a more or less complete oil film which persists, and spreads for some time after application. It is this oil film that gives the trees the "greasy appearance" sometimes objected to by growers, but which in

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Citrus Industry a trade

The Net Return Problem

The following talk was broadcast at 7:10 P. M. Apr. 27th by Mr. Archie M. Pratt, nationally known marketing expert. This was broadcast by Station WDBO on 240 meters from Winter Park, Fla. Mr. Pratt is conducting an open forum and answering questions addressed to the Radio Question Box at 7:10 each Tuesday Evening.

One of the questions that was offered to the WDBO QUESTION BOX is so comprehensive and to the point, that we will give what time we have tonight in attempting an answer. A Grower asks:

"How Can I Be Sure That I Am Getting the Best Returns Possible For My Crop?"

The question is opportune because from now on growers will be trying to get their bearings on how well or how poorly they did. Some growers sold their crops outright. They want to know whether they used good judgment or not in selling at the price they did. Other growers placed their fruit with whichever man, firm or organization they felt might offer the best chances of netting the most money.

Some day the citrus industry may be organized where direct representatives of the growers as a whole will have means of gathering and comparing data that will show true tests from each of the many different experiences of growers in their earnest efforts to market their fruit in the best possible manner. Until the growers have some sort of a clearing house through which net returns may be expertly compared in a comprehensive, thorough manner there will be no way of reaching conclusions that anyone could claim would approach scientific correctness. Take for instance my experience as a grower—and I am going to be frank!

I was compelled upon knowing I was leaving for Florida to decide what medium of marketing I would use in disposing of about 25,000 boxes of oranges in which I was interested.

As I began studying on this problem I had to smile at my former over-zealous and partisan conviction that my special brand of marketing was better than others. I turned over in my mind the different men I knew, who had been competitively operating along marketing lines like myself. I began to realize how equally efficient and deserving they all were. It bothered me that with all the insight which a man should have had who had marketed oranges for 25 years, I found it difficult to pick out any one man or organization that had by test shown outstanding superiority in packing and marketing. It was like trying to choose between my own children as to which was my favorite, as each one seemed to be equally deserving in their special way.

I finally decided; and in analyzing my decision I realized that it was not based upon an exhaustive analysis of comparative net returns. I knew that I couldn't give the time that such a comparison required, as it would mean battling with comparative values due to sizes, comparative time of shipments and the relative market fluctuations during those shipping periods. Besides this I would have to find out something about the comparative merits of the fruit itself and how it compared. Having been in the business of marketing all my life and having been frequently impatient because growers couldn't see how superior my brand of marketing was I now found that as a grower I couldn't pick the superior one, and more than that I realized the futility of reaching a choice between the long standing best operators on the usual superficial comparison of returns.

I put about 60 per cent of our crop with one organization that is working on a definite charge for packing and selling, and a charge which seemed rather high compared to the average packing and marketing expense. I put the other 40 per cent with another organization that handles on a cost basis. I know that both will go the limit to excel in net returns. I know that either of them would have done so without splitting the crop. If I get more returns from one than from the other this year, and doubtless I will, I confess it will not be a proof to me that the organization that paid the most this year is necessarily the one that will always get me the most money, nor prove that the organization that paid the less money this year has necessarily the less merit in it from a market service standpoint.

I am confessing, as you see, I am also having to admit that although I am in the marketing game as a business itself, I realize I know so little that I would not attempt at this distance to sell my fruit outright to any of the cash buyers in California. My experience convinces me that my chances are far better to select one of the high grade established marketing organizations to serve my interests.

Selecting a man, firm or organization who is going to handle your crop for you is more or less like your selection of friends. Our friends may not really be our own selection, but rather just the happenstance of association or contact. But each of us has found certain few that deserve the name of friend, whom we can trust implicitly, and where that trust seems mutual.

Here in Florida I have been impressed with the high type of integrity on the part of those men who represent the citrus packing and marketing business. They are men who are deserving of confidence. And the friendly rivalry existing in attempting to excel in service to the grower is to my notion a very healthy situation that should increase that general confidence between a grower and his packing and marketing organization.

But how do these remarks answer the question?—"How can I be sure I am getting the best returns possible for my crop?"

The answer is this: None of us know. If any of us were sure that we had some leadpipe cinch that insured our netting more returns than any other live, progressive competitor, we could get out with carefully compiled, legal guarantees that would insure any grower netting not only what he could get through anybody else but in addition the bonus that our leadpipe cinch would pay. A few have had such unbounded confidence in themselves as to solicit business along these lines, but they usually went busted.

You can and should compare your returns in an open minded manner with your neighbor. You can reach certain general conclusions that will eliminate certain types of packing or marketing service where inefficiency and possible lack of integrity has been quite evident, but when it comes to comparing the best that has survived the continual competitive test of years, you might just as well figure that you can't prove you are right. Your decision will be influenced by what friendly insight you have in the marketing medium used, and by what genuine interest is shown in your problem by such a medium. Confidence and faith are still necessary. Friendliness is back of decisions so much more than we realize that this friendship is sometimes abused in the desire to procure business. Your selection of your marketing medium is certainly far less im-

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The Citrus Industry

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CITRUS CALENDAR FOR MAY

Timely Suggestions for Grove Work During the Present Month

Prune late bearing trees as soon as crop is removed.

Spray for scale and white fly with oil emulsion.

White fly may be controlled by a fungus parasite; calculate the number of cultures that you will need; write to the State Plant Board, Gainesville, for them.

Cottony cushion scale may be controlled by the Vedalia or Austrailian lady beetle.

Spray grapes with 4-4-50 bordeaux mixture plus 1 pound of lead arsenate to 50 gallons of spray to control scab and chewing insects.

FERTILIZATION

Nothing which enters into the production of citrus fruits is of greater importance than fertilizer. Whether the grower seeks quantity production or quality production, he must give serious consideration to the problem of proper and adequate fertilization.

For this reason, and because no fertilizer application is of greater importance than the mid-summer application, The Citrus Industry each year sets apart one issue, the May number, for special consideration of fertilization and fertilizer problems. Following out this established custom, the present number of The Citrus Industry is devoted largely to a discussion of fertilization in general and to the importance of the mid-summer application now about to be made.

The authors of the various articles and papers contained in this number are well known to Florida growers. They are among the best posted and recognized authorities on citrus problems and have had long and active experience as growers as well as scientific experts along cultural lines. Their articles will be read with interest and profit by the growers, and the information and deductions given should serve as the basis for proper and effective fertilization when applied intelligently with due regard to local conditions which may call for modification or enlargement of the programs recommended.

One point The Citrus Industry would emphasize, and that is the importance of knowing that you are using the right formula to meet your own conditions, and that the materials entering into your fertilizer are of standard quality. As one writer in this number puts it, "it doesn't pay to be changing to unknown brands for the sake of saving a few cents or a few dollars".

In the production of quality fruit, and that is the kind which returns the grower the greatest profit, the first essential is to properly feed your trees. Having done this and made the proper fight against insect pests and other fruit enemies, the production of quality fruit will follow.

JARDINE VISITS FLORIDA

The recent visit of Secretary of Agriculture William L. Jardine to Florida should prove of benefit to the growers of the state. Through this visit the secretary comes into personal contact with the growers and their problems and will in the future the better understand conditions in the state and the problems which face the growers. Having this knowledge at first hand, the department will the better understand the needs of the grower and be better prepared to render assistance.

In a talk at Orlando, Secretary Jardine complimented the Florida marketing organizations on their efficiency, but stressed the need of bether methods in grading and packing fruit and standardizing varieties. Better care of groves and greater attention to the welfare of the individual trees also was recommended by the Secretary. Reduced railway rates and greater uniformity in marketing were pointed out as two of the essentials to the permanent success of the indsutry.

THE OUTLOOK

The Citrus Industry looks forward with confidence to the coming season, but it believes that every marketing organization, every shipper, buyer and packer, as well as every grower of citrus fruit, should be on the alert to take advantage of every opportunity to post himself on conditions as they arise and to further every movement which may affect the stability and upward trend of the price. Equal diligence should be exercised to counteract any unfavorable influence which may arise. In the meantime, much good may be done by getting squarely behind the Fruitmen's Club in its effort to nationally advertise Florida citrus fruits.

Fla State Horticultural Society

Echoes of the Horticultural Society's Meeting

By Frank Kay Anderson

Cocoa and Rockledge fairly outdid themselves in the cordiality of their reception of the visitors, and the efforts for their comfort. One thing which made a particular hit was the distribution of blue tags for the autos which in addition to words of welcome further said: "This card entitles you to park your car as long as you please in Cocoa."

The New Indian River Hotel proved an excellent place for the meetings. In its beautiful location it is a bit removed from town, and in as much as everything took place under its roof the attendance upon the talks perhaps comprised a larger percentage of those registered than ordinarily is the case.

The total attendance was below the figures which have been reached at some previous annual meetings, but was generally very satisfactory.

Recent inroads of Death upon the older members of the organization are very noticeable at the annual gathering. The late Myron E. Gillett, Dr. J. H. Ross, E. N. Reasoner and Senator Derby of Rockledge for a great many years were most important and regular features of the annual meetings.

The Cocoa meeting also was notable for the absence of a number of progressive growers who are closely identified with the affairs of the Florida Citrus Exchange. Some explained this by the fact that the Tuesday upon which the meeting opened was the occasion of the annual election of officers by each of the Exchange's local associations; and the suggestion was made that many probably remained at home on that account.

President L. B. Skinner's conduct of the meetings as usual was most satisfactory to the members, and did much to expedite business without stifling discussions. Mr. Skinner for a great many years has given most freely of his time to studying the horticultural problems of the day; and is the society's foremost individual figure.

Bayard F. Floyd is always one of the most dependable attendants upon the society's meetings, and as usual was much in evidence.

Dean Wilmon Newell of the College of Agriculture of the University, and head of the State Plant Board, takes a keen interest in every discussion of a horticultural subject before the society, and at Cocoa, as at previous meetings, was always a center of a group interestedly discussing current problems.

W. W. Yothers was doing a lot of work dishing out receipts for dues at the secretary's desk; and at the same time trying to keep up with all that was going on.

C. W. (Joe) Lyons naturally was much in evidence; and notwithstanding he is a sustaining member of the organization took out an oversize membership for the purpose of this meeting.

That is as it should be, Joe. We personally are a life member of the organization but we have never gotten by a single meeting without paying the yearly dues. You can't blame the secretary either; the society needs the money, and deserves it.

The proposed joint advertising campaign by all the citrus marketing agencies came in for a very considerable discussion among the growers present.

C. C. Commander, general manager of the Florida Citrus Exchange, was unable to be present at Wednesday's gathering. His paper on the subject of advertising Florida citrus fruits was read, and well presented, by John M. Moscrip. It was a lengthy paper but, contained a large amount of important and apparently very carefully prepared material.

Following Mr. Commander's paper Victor B. Newton, general manager of the Standard Growers Exchange, and president of the Fruitmen's Club which is sponsoring the idea of the joint advertising campaign, made a brief but able appeal to the growers to lend their moral support to their preferred marketing agencies in the movement which is contemplated.

Frank L. Skelly, of the American Fruit Growers Inc. followed Mr. Newton on the floor in explaining the proposed advertising plan. He expressed great confidence in the board of governors which has been selected to handle the proposed campaign for the various shippers; and gave it as his opinion that the growers could feel assured the money would be well and carefully spent, and that the campaign is to be of high character and effective.

In as much as the five cents per box it is proposed to levy to support this advertising cannot be financed out of the ordinary marketing charges, it really devolves upon the growers themselves to say whether or not the campaign is to become a reality.

In connection with the advertising discussions, the name of Mrs. Caroline Moorehead of Ocala was mentioned as one who, through her very successful campaigns in the North demonstrating the uses and delights of Florida oranges and grapefruit has done a very great deal for the industry here. Personally we are inclined to agree. Mrs. Moorehead's work undoubtedly has been most effective, and we doubt if ever her efforts will receive the recognition they properly deserve.

Riley M. Fletcher Berry of Sanford is another who might well be mentioned. Mrs. Berry's work of research in the uses of citrus fruits for many years was untiring; and her books of recipes for the use of Florida oranges and grapefruit have been circulated in the North by hundreds of thousands.

Bart O'Hara at his home on Merritt's Island, opposite Rockledge, entertained a number of prominent members of the society. Mr. O'Hara is at this time interested in the possibilities of citrus byproducts, and has some interesting exhibits.

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Citrus Fruits — Husling

The Citrus Industry of Florida

Paper Written by C. C. Commander for Presentation at the Florida Congress Meeting in Palm Beach, April 16th

No comprehensive picture of the Citrus industry of Florida can be given without some consideration of the origin of the fruit itself. Because of the many misstatements concerning this early history and in order to furnish us a background for further discussion, it may be well to cite the facts as far as it is possible to determine them.

The first authentic record of the citrus fruit from which our modern orange came takes us back to the early part of the eighth century. There seems to be no question that both the sweet and bitter orange flourished under the shadows of the Himalaya Mountains in the Valley of the Ganges at this early date.

It is thought that the Arabs, during the early part of the eighth century, carried it into southeastern Asia, for towards the close of the ninth century and the beginning of the tenth century it seems to have been freely cultivated in Arabia.

During the twelfth century, after having been introduced into Servia by the Arabians, it was carried by the soldiers of the Cross, returning from their crusades, into Palestine and Italy.

The bitter orange, known as the Sevilla, undoubtedly comes from trees brought into Spain by the Mohammedans during their conquests. The fruit from this section is still used by all English manufacturers as a basis for their marmalades. It is interesting in this connection to trace the derivation of orange from the "nagrunge" of the Sanskrit into the "naranj" of the Arab, which passed by easy stages into "aranji" of the Roman, only in turn to become "arancia" of the Italian, which later became the provincial orange. The Arabian name "naranj" became in Spanish "naranja" and it is easy to surmise that the town of the same name on the eastern coast of Florida came direct from the early Spanish term "naranja", meaning orange.

The sweet orange seems to have come from Central China and Java, and does not seem to have been introduced into Europe until a much later date than the bitter orange, probably sometime during the latter part of the fourteenth century, or the early part of the fifteenth. It was, however, commonly cultivated in Italy, during the early part of the sixteenth century, and undoubtedly brought from there by the Portugese to the Azores, and later on the West Indies, and from there probably into Florida. While there is no historical record of this later date, it is supposed that the orange was first brought to America by the founder of St. Augustine in 1565. But little progress was made in its cultivation, however, for when Florida was taken over from the Spaniards some 250 years later, the industry had gained but little headway. Since then constant observation, countless experiments, most careful study of its growth, and above all, the final discovery of the root system of certain hardy varieties, to which was added the bud-stock of a prdoucing orange tree, has finally resulted in what we claim today is the best orange produced in the world.

C. C. Commander

There is no fruit that can compare with the orange in the number of years of life in production. Near Madrid, Spain, is an orange tree, which according to the records, is 633 years old, showing no signs of decay. Several groves in Southern Spain are said to be 400 years old. In our own country there are trees that still bear abundantly from fifty to eighty years and more, so that an owner of a grove in Florida, without fear, can claim to have an everbearing property.

The grapefruit is of comparatively recent development. Less than a century ago, Captain Shaddock brought a fruit to Florida from the East Indies, which took the name of the old sea captain. The bloom of the shaddock had the appearance and fragrance of the orange blossom. The shaddock produced clusters of huge fruit many of which measured as much as eight inches in diameter. The inside of the fruit had a pinkish tinge and was pithy and not edible. It had no more commercial value than the ordinary mock-orange, though it became popular as an ornamental tree for lawns and walks.

Citrus fruit nurserymen were not slow, however, to see the promising field for experiments which the shaddock offered. Having all the characteristics of the orange, they bred it with the orange and rough lemon, and through a series of interesting experiments finally produced the "Pomelo". or grapefruit of today.

The raising of citrus fruits had rapidly passed from a pastime to an important state industry. Here in Florida, the fact that the citrus industry produces the largest agricultural revenue available to the state is not news. It exceeds in returns to the state all other farm products combined. It is nearly twice as great in commercial value as the products of Florida's saw mills. It is two and one-half times greater than the value of her naval stores. It is three and one-third times greater than the value of her fisheries and her mineral products. It is exceeded only by Florida's mammoth factory produce,which is three times greater commercially than the present citrus volume.

There are 288,656 acres planted to citrus in the state. Of this total 176, 000 are bearing. The balance, or non-bearing acreage, applies to all trees four years of age or less.

A conservative estimate of the value of these groves, when they come into full bearing, should not be less than $800 per acre. On this basis, the total value of our investment in grove property in the state approximates $231,000,000. Added to this total should be the investment of packing houses. There are about 250 of these in the state representing a value of $6,000,000.

Further consideration of the capitalization of the Florida citrus industry should include the values of complementary businesses — fertilizer, spraying, grove equipment, packing house machinery, etc.

The citrus industry, then, may truthfully be referred to as the back bone of Florida interests which effect a favorable balance for the state.

Nor is the industry an insignificant national figure. The 1924-25 citrus crop returned $51,469,280 to the state's marketing agencies. Exclusive of grains and other non-competitive products, this figure ranks fifth in American agricultural industries. It is exceeded only by apples, grapes, peaches and California citrus.

The commercial growth of the industry is unusual. The commercial movement of the crop increased from 1,260,000 boxes in the season of 1886-87 to 19,200;000 boxes in 1924-25. The increase in acreage planted to citrus has been relatively the same.

Florida citrus has increased tenfold in the past twenty years. There is every indication that, within the next ten years, it will gain double.

And there is room for untold increases beyond this point.

In studying the possibilities of future growth for citrus industry, it is necessary to consider the potential from a physical, or production, standpoint.

The total bearing and non-bearing citrus land in the state was previously cited as 288,656 acres. Of this area 66 per cent is planted to oranges, 28 per cent to grapefruit and the 6 per cent balance to tangerines, limes, satsumas and lemons.

288,656 acres of citrus groves, nearly 500 square miles! Great as this area appears, however, it is just slightly less than 5 per cent of Florida acreage which is suitable for citrus production. The latter is estimated to be in the neighborhood of 6,000,000 acres.

It is difficult in the extreme to determine average figures on the cost of production due to the wide variance in districts facing similar or nearly similar conditions of soil and care. According to Professor De Busk of the Florida University, this figure varies from $.15 to $1.50 per box. All available records, including these, indicate that there is much for improvement in cultural practices which will not only improve the grade and quality of the fruit, and increase its per tree production, but will also lower the cost to the grower, thereby increasing his net return.

Much intelligent attention is being given these problems. It is to be expected that the results will be evident in future increase of the citrus volume.

It is interesting, however, to note the cost per acre under average soil conditions in developing and bringing to five years of age a grove in the sand hills region of Florida. Based on a ten acre unit, the initial cost, including land averaging high at $200 per acre, clearing, plowing, disking, staking, planting, cost of trees, fencing and a shed for tools, comes to $2,960.50.

Maintenance cost, including cultivation, plowing, banking cover crop, fertilizer, spraying, taxes, etc., varies from $262 the first year to $766 the fifth year.

The total cost, exclusive of interest, to five years of age, is $5,297, or about $530 per acre. The grove then enters a state of limited bearing, producing income.

These costs are not excessive, and are well within reach of many prospective residents of Florida who, having limited finances, are forced to seek a profitable income producing investment while taking advantage of the pleasant and healthful climate of the state.

With these figures in mind, it is readily evident that there is practically no physical limitation to the increase in production which may be allotted to Florida citrus. Greater handling machinery, fertilizing and sprayer interests, packing houses, etc., which are an integral part of commercial production would naturally follow.

The future growth of Florida citrus volume is, however, limited by economic factors inherent in the law of supply and demand. The industry cannot profitably grow faster than markets can be found for its production. In discussion marketing possibilities for Florida, I want to preface my remarks with the statement that the future never appeared more bright and that there is every reason for optimism on this score.

I will not open any discussion of the state's citrus marketing machinery other than to say that there is a steady gratifying growth of confidence and cooperation on the part of most citrus operators in the state. More regular movement of the crop and healthier distribution is constantly being effected. This changing attitude is at present best illustrated by the support being accorded the present plan to advertise Florida citrus as a whole.

Speaking of marketing possibilities, then, I am considering the potential for all Florida's citrus fruit rather than that for any individual brand. The latter is not pertinent to the present discussion. The sale of the mark is a matter of concern to the particular shipper owning it. Some attain excellent success in the use of their brands, others gain but mediocre results.

Viewed from an economic or marketing standpoint, adequate markets must be found and developed for heavy future increases. If the entire crop were to be sold on box fruit markets and reach the ultimate consumer in the fresh fruit form, the national market for Florida grapefruit is all of the United States with the exception of California and Arizona. For Florida oranges, we may exclude the 15 per cent of people living west of Denver. The 100,000,000 people who are prospects for Florida oranges are made up of approximately 25,000,000 families.

Without taking time for a discussion of the European market, let us assume that its potential is about half that of the entire domestic market. The steps being taken to develop it are more or less familiar to all of us.

This immense consuming body is stores, 96,892 hotels and restaurants of which can be developed as sales —a total of 540,759 retail outlets, all served by 292,000 grocery stores, 6,000 delicatessens, 145,930 general channels for Florida citrus.

If a 20,000,000 box Florida crop were to be sold as fresh fruit through these established trade outlets, each store would be required to handle less than forty boxes per year—a very low average.

The consumers are readily available. They are served by adequate jobbing, wholesale and retail outlets. The chief and imperative requirement, one insuring the profitable sale of an increased Florida citrus crop is the provision of steady repeating consumer demand.

That the market has barely been scratched is readily apparent. Figures I have elsewhere cited place the per capita consumption of oranges at 60, and grapefruit at 5. This means that every person in the United States who eats more than one orange a week is cutting in on somebody else's share. Or if a person eats more than one grapefruit every two months he is using more than this average allows. It is not unreasonable to assume that five, ten or even twenty-five times that per capita consumption is too great, particularly with regard to grapefruit.

One cannot discuss the future development of Florida citrus marketing without touching on the canned grapefruit industry. It is a powerful sales and distribution aid.

The canned grapefruit production last season through the three canneries operated reached a total of nearly 200,000 cases. Many orders remained unfilled. Properly handled, this industry faces an immense

growth. The product is ideal for use in salads, special desserts, etc. It loses none of the health building qualities of the fresh fruit. It provides a citrus food available the year round.

The growth of this phase of the industry is vital in the future profitable increase of citrus as a whole. Since a field crate of fresh fruit is required to make a case of the prepared product, canned grapefruit affords an outlet for hundreds of thousands of boxes of the fruit at a profit to growers that would otherwise be lost. It also removes low grade, offsize, off-color fruit from the box market, to the considerable benefit of the latter.

Here again we find an adequate consumer market, with effective trade outlets—all waiting for development. And the exploitation of that market for increased Florida citrus crops is again a question of the stimulation of demand for citrus.

Still newer in the industrial progress of citrus is the successful work of a local firm which has developed a citrus juice concentrate. This product loses none of the quality of the fresh fruit and, when diluted, preserves the appearance, taste and odor of the fresh fruit juice.

This concentrate can be bottled or canned. In this form it is readily adaptable to economical handling, opens up another tremendous field for the consumption of Florida citrus. Sold in this form, we will be in a position to successfully cut in on the tremendous soft drink business of today with a product which, because of its purity, is bound to meet with a ready acceptance on the part of the public.

In my discussion of the sales potential and outlets for fresh fruit, I purposely omitted mention of the volume sold to fountains. This is considerable at present, but its increase is seriously limited by the difficulty of handling and dispensing in large quantities.

None of these difficulties are faced by the concentrate. For material development in the soft drink field then, I believe we must look to this citrus product. It can be brought to the consumer through the 670,018 established retail outlets for soft drinks..

We cannot treat lightly the possibilities of this citrus concentrate in the soft drink field. American consumers paid $500,000,000 during 1925 for soft drinks. Many of these products are synthetic imitations of pure fruit juice. Many are even harmful.

The market potential and the attitude of the American public today has been amply expressed by Mr. Hastings, Director of Physical Culture, Food Research Laboratory in New York in an article "Getting Fruit Juices From Coal Mines." Mr. Hastings says in part:

"The synthetic or chemical imitations of fruit juice or fruit flavor may or may not be poison, but it is always a fake and a fraud, for which we pay our dimes because we are thirsty and the stuff is usually wet and sometimes cold. The real merits of real fruit juice are a real fruit flavor, and real mineral salts of genuine food value and real vitamins with the kick of life still in them. In the chemical concoctions we get none of these virtues, in fact we get nothing at all but bright colors and loud smells and sour or sweets tastes as the case may be. But selling booze is unlawful and selling water is unprofitable, and we are awfully thirsty and awfully easy and selling soft drinks is a soft snap and we are a lot of soft-brained, sap-headed suckers.

"There are a few types of made drinks that have a legitimate place, such as carbonated waters and ginger ale. But when we leave these and go into the colored and fruit flavored drinks, there is no honesty in them and no place to draw the line except drink genuine fruit juices or stick to water.

"There are literally billions of bottles of these bum imitations of fruit juices, and more billions of glasses of the same, or worse, concoctions consumed every year. Why? Because it it cheap stuff to make and the public accepts it, and hence there is money in making and selling it. The formula varies from bad to worse. The worst ones have nothing whatsoever in them that could class as good food except cane sugar, which is a bad food of which we get too much any way. The worst acid ingredients are mineral acids, which are bad not because they are direct poisons but because they add to the content of the body, already too high from an acid forming diet. Add to these faults artificial coal tar flavors and coal tar coloring and we certainly haven't a health drink, even if there is a picture of Samson lifeing an orange on the bottle."

Here is a market already created for a bona fide, unadulterated citrus fruit drink. The concentrate citrus fruit industry can be developed to supply this tremendous demand. This is without even considering the hospitals and sanitariums throughout the country where ready sales would be found.

Another tremendous field opened to Florida citrus by this juice concentrate has been provided by Mr. Volstead. It can be used for beverage purposes to compete with malt syrup. The size of this potential business is evident from a study of a single market—Detroit.

About two years ago the Government brought suit against one of the largest brewing companies in Detroit, making it a test case in the endeavor to stop the sale of malt syrup. This case was lost by the Government and the business has continued to grow ever since.

During the trial evidence was presented showing that the sale of this one brewery in Detroit amounted to 1,600,000 gallons of malt syrup during the twelve months of the year previous to the trial.

I will point out to you that this is only one brewing company in one city of the United States and in Detroit alone there are four large brewing companies in addition to the one mentioned, making malt syrup. From inquires in the fray I am positive that there is in excess of three million gallons of malt syrup being sold in Detroit alone.

For comparative purposes, I would say that it would require six million boxes of grapefruit to manufacture sufficient concentrate to equal the consumption of malt syrup in this one city.

The juice concentrate industry can be made as much an integral part of the citrus industry as canned grapefruit. It will effect the same results, namely remove low-grade from the fresh fruit market, and provide a profitable market for hundreds of cars now lost.

Here again, however, success is contingent upon adequate consumer demand for citrus.

It is readily evident that the entire program of profitable production increases in Florida citrus may be narrowed down to a question of increasing per capita demand. The state has a vast capacity for increase. Adequate markets are available.

A natural question to ask concerning this work of creating demand is, "Can Florida oranges and grapefruit be made so attractive to the consuming public that it will use them in preference to not only other citrus fruits but also other food products which tend to replace Florida citrus on the daily menu?"

There is an immense fund of information available for this use. During the past two to five years citrus fruits have enjoyed one of the most prominent positions with highly favorable results in the work of food economists, food specialists, dietic-

ians, physicians and other bodies advisory to the American diet. Food editors of leading newspapers and magazines the country over are becoming more and more conscious of the value of citrus fruits on the daily diet. They are advising their millions of readers to this end. Their work is backed by hundreds of intelligently planned and competently executed experiments and research on the value of citrus to the human machine.

Upon examination of these findings, one immediately runs into the subject of vitamin content. Vitamins are too little known to hold any important place in our discussion. No vitamins have as yet been isolated. Their chemical composition is not known. Their presence is determined by the reaction on groups of animals. In this manner also is their relative quantity in various food products computed. The research work along this line is constant. Many findings are constantly being brought to light. Just recently the vitamins "D" and "E" have been discovered in citrus fruit. We all have long been familiar with vitamins "A ", "B" and "C".

With this lack of definite knowledge and hesitancy on the part of acting research authorities, it is not practical for us to make definite statements of comparison of vitamin content for citrus. We probably would not be wrong in stating that there are more vitamins in a glass of orange juice than in a pound of beef steak, but that will not help us in persuading the public to give up meat or other foods for an exclusive use of any citrus juice.

Our chief strength in the popularizing of citrus in this respect lies in the fact that the juice, probably because of its vitamin content, enables the body to obtain greater value per unit of solid food ingested.

One of the most recent experiments along this line was conducted by Katherine Blount of the Home Economics Nutrition Laboratory Department of the University of Chicago. Their work furnished definite proof that citrus juice increases the retention of calcium, potassium, magnesium and nitrogen compounds in the human body. We are familiar with these compounds as necessary for building bone, teeth, muscular and nervous tissues, etc. Citrus juice is a most powerful agent assisting the body to assimulate these necessary units from the normal diet.

Thus, discriminately used, the vitamin content appeal for citrus is valuable. It strikes a popular note in the public mind.

The value of citrus fruit juices in the building and maintaining of health is not to be disputed. Its aid in the treatment of constipation is commonly known and authoritatively accepted. This is a constipated nation. Countless remedies for this evil—some few beneficial, others seriously harmful—meet with ready sale everywhere. This condition provides for citrus a most powerful demand—stimulating appeal to the American public of today.

We have in our files certified statements for the results obtained by a prominent physician in the use of citrus fruit juice, particularly grapefruit, in the treatment of colds and influenza. These diseases are accompanied or induced by an excess acidity in the blood. Contrary to public belief, citrus juice increases the alkalinity of the body, a condition prejudicial to the existence of this germ life. Its use thus only tends to make the body not only more resistent to the germs of these diseases, but also effects cures. The authority to whom I refer used this method of treatment during the flu epidemic immediately following the war and did not lose a case after his adoption of this policy.

These facts were effectively used by the Fruitmen's Club of Florida in a grapefruit advertising campaign last season in a dozen or more important northern markets. The response was immediate. Prices rose from $2.00 to over $5.00 per box during the week to ten days following the institution of this campaign. Here is ample evidence of another proven copy appeal which can effect a tremendous increase in demand for Florida citrus.

Millions of dollars are spent annually in the attempt to secure personal beauty. The tremendous sale of creams, skin beautifiers, fat reducers, body builders, and whatnot, is ample evidence of the size of this business. Citrus fruit, by correcting and balancing the diet, is recognized by authorities as being invaluable in bringing the over—or under-weight person to normal, in clearing up the skin, in toning up the constitution in general,—in short, to provide those basic constitutional necessities which are imperative for personal attractiveness. Here again is a broad field and a consumer sales angle for substantially increasing the demand for Florida citrus.

These are but a few of the many powerful angles by which the consumer public may be effectively reached and sold on citrus. Many others might be outlined. All merely indicate the fact that there are ways and means by which many times the present consumption of Florida citrus may be obtained.

I will not take time to go into a discussion of the possibilities in competition between Florida citrus fruit and citrus friuts from other fruit producing sections of the world. Suffice it to say that we have ample ammunition not only to protect ourselves on this score, but to wage an intensively agresssive campaign should the necessity arise. The facts favor Flordia citrus.

Briefly outlined you have my basic reasons for optimism regarding the future of the citrus industry of Florida and of its increasing value in the econimic stability and growth of the state.

We have discussed present production and possibilities for increase. We have found that there is practically no limit in this respect. We have outlined markets and their possibilities. We have cited ways and means by which adequate demand for the increased production of Florida citrus can be stimulated.

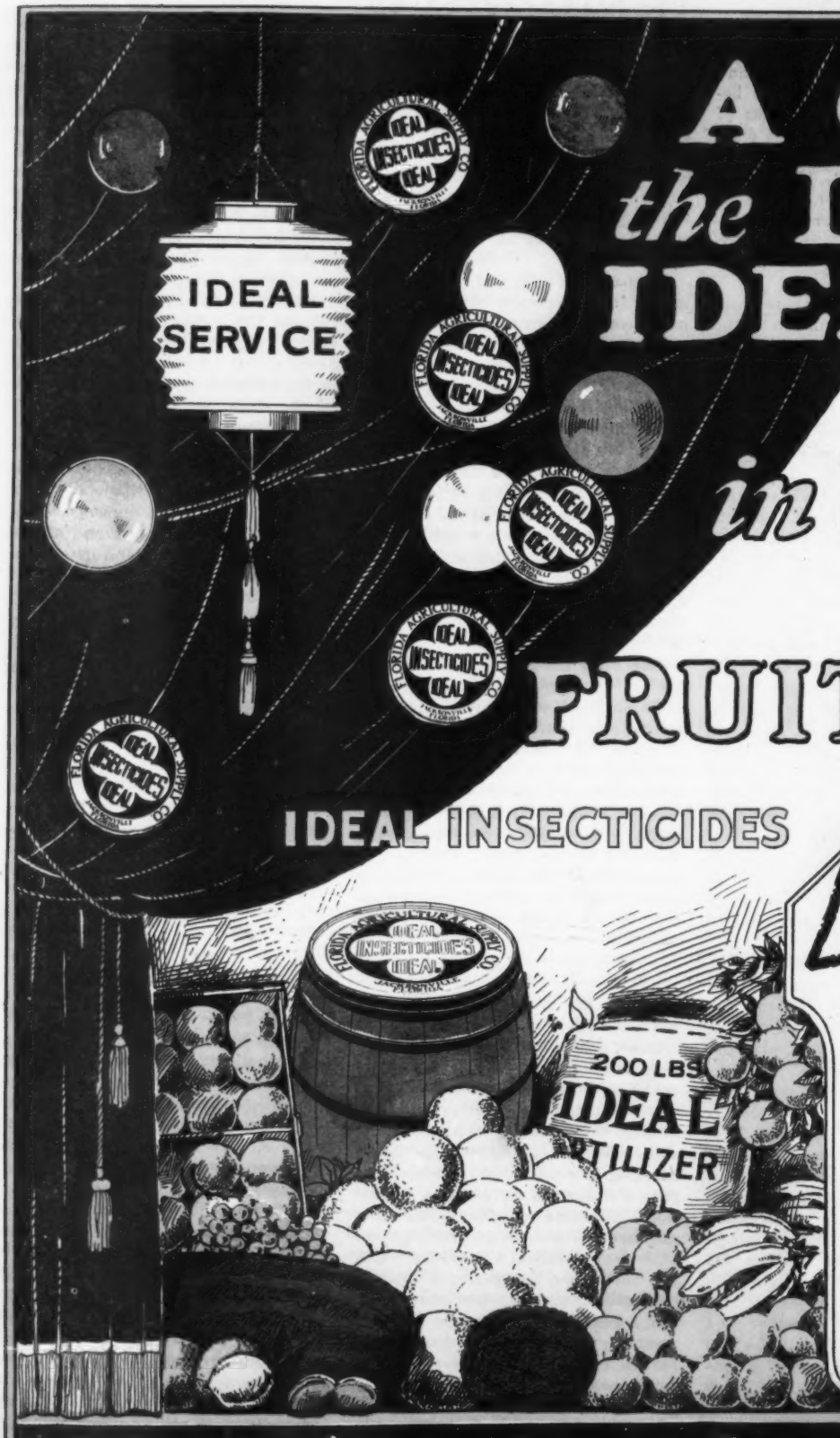
With these facts in mind, it is by no means an exaggeration to speak of the future of the citrus industry as being most bright indeed. It well deserves its title—"Florida's Greatest Industry."

TWO HOME ECONOMICS INVESTIGATORS WILL TRY THEORIES ON RATS

Gainesville, Fla.—A rat "dormitory" is being completed on the Experiment Station farm here. It will have all modern improvements, including heat, electric lights and water. It will house a number of blue-blooded pedigreed Norwegian White rats and some baby chicks.

The building is being erected under the supervision of the home economics department of the Experiment Station, of which Dr. Ouida Davis Abbott is head. Miss Georgia Westover, assistant in home economics investigations, has been appointed curator of the rats, and is expected to disprove the old rule that women are scared stiff by the sight of rats—or to prove the exception to that rule, as the case may be.

The rats and chicks will be used in certain experiments on nutrition which the two women of the home economics department expect to conduct. According to Mrs. Abbott, it is hoped to get results which will enable the experimenters to recommend certain dietary practices as being good and to determine others which are not so good.



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Citrus Fruits, Florida

Observations on Florida by California Citrus Grower

By J. D. Culbertson, Santa Paula, in California Citrograph

Florida is a land of many charms and interesting surprises. The Californian is so accustomed to mountains and vast expanses of desert, or near-desert, that Florida's absolute lack of mountains seems strange by contrast, and her never-ending stretches of evergreen woods and tropical vegetation are a constant wonder and delight.

Though Florida's earliest settlement dates back to 1565, yet even today, 360 years later, less than 10 per cent of her approximately 35 million acres of land has ever been cleared of its native growth and planted to crops. Nor is this because all of this remainder is unsuited to agriculture. By far the major portion of it needs to be cleared at an expense of from $50 to $150 per acre to make it ready and suitable for a variety of annual crops and much of it for orchards.

To the writer who has seen the rush of settlers to the middle west, and later for 30 years has witnessed the heavy annual migration of homeseekers to California, it seemed almost incredible that so many millions of good acres of Florida are still to be developed. The limiting factors that have retarded the development of the west—particularly uncertain and limited rainfall and limited and expensive supplies of irrigation water and long distance from market—these have played no part in the retarded development of the south. To be sure, many of the southern lands require fertilizers for the production of profitable crops, but they respond marvelously when the needed materials are applied; their rainfall is quite adequate and reliable, as a rule, and the markets of the nation are "next door."

Political, social and economic factors have held back the south. First the civil war robbed it of most of its young men and seriously depleted its ranks of the older men of vigor and resourcefulness. The liberation of the slaves disorganized its labor relations and supply, thereby complicating production and increasing its costs. Simultaneously came the settlement and rapid development of the great Mississippi valley, the states of the plains, California, and the great northwest. These western lands, for the most part, required no clearing but had only to be plowed to be planted, and were so fertile that for half a century few even thought of fertilization. They have given to the nation almost unlimited quantities of agricultural products at such low costs that neither the east nor the south could compete in the markets of the country or the world.

But the pendulum is swinging the other way. The vast empire of almost free lands in the west has been appropriated, while production costs in the west have risen to a point where a new equilibrium gradually has been taking place, and the south is "coming back"! With modern farming methods, scientific fertilization, drainage, and even occasional irrigation, and perhaps of even greatest importance the diversification of crops, a new day is dawning for the south and it already has become a second "west"—another frontier, calling to the home-seeker and investor as it never did before.

In the state of Florida, from the days of the Spanish land grants over a century ago, on down to this decade, vast tracts of land running even into the millions of acres, have been held by capitalists for speculation, by railroads for essentially the same purposes, or by the great lumber and turpentine interests for exploitation, by the "cattle kings" who almost made the laws of the state for two generations and by wealthy northerners for private estates and hunting preserves. But recent appreciation of values, greatly increased taxes, the passing of the generation of men who acquired these vast holdings, and the opportunity to sell them in smaller tracts at prices often many, many times what they cost—these factors are breaking up these holdings and opening the way for a future progress out of all proportion to the slow development of the past.

Climate and Agriculture—the Two Great Resources of Florida

When gold was being discovered in California 77 years ago Florida's wonderful winter climate had already long attracted the easterner who could afford to spend his winters in the south. The Mellon family of Pittsburg; W. L. Douglass, the shoe manufacturer; Thomas A. Edison; John B. Stetson, the hat manufacturer—these are but examples of thousands who have regularly maintained winter homes in Florida for from 25 to 45 years. And the number is rapidly increasing. Like California, Florida can always regard its attractive climate as a real and permanent resource.

But her greatest resource is agriculture. To the casual or even interested traveler in October the impression of a lack of diversity of agricultural crops is very pronounced, and yet the Florida state department of agriculture, in its annual reports of production and shipments gives figures quite the opposite. As a Californian the writer evidently thought too much about the products grown in his own state which were not in evidence there. In one season or another almost every farm product can be grown commercially, exclusive of some of the fruits, and particularly for the growing of winter vegetables it is doubtful if either in variety or quality any state can surpass Florida.

Diversity in the commercial production of fruits is certainly much more limited. Citrus fruits are so conspicuously in the lead that all other fruits together seem of little commercial consequence. Strawberries and pineapples—hardly comparable with citrus as fruits—come next in value, with annual shipments of approximately 850 and 285 cars respectively.

Florida Citrus Industry

Florida's citrus orchards aggregate approximately 240,000 acres and the citrus fruit shipments for the 1923-24 season were as follows:

Oranges	36,046 cars
Grapefruit	23,066 cars
Tangerines	1,129 cars
Total	60,241 cars
For 1924-25	53,254 cars

California's citrus acreage is about 10 per cent greater than Florida's with average annual shipments approximately the same.

Soils

The two words that describe almost 100 per cent of the surface soils of Florida are "fine sand." In some areas it is coarser than in others, or frequently darker in color, indicating greater fertility, with a few spots here and there where the

out-crop of coral rock in broken fragments forms the major portion of the soil layer overlaying unbroken but somewhat porous subsoil of coral limerock. A more careful and deeper examination of some of these soils reveals subsoils of quite different character, often carrying rather large percentages of clay.

The reader can imagine the writer's astonishment at seeing many farmers disking their fields within an hour after brisk, heavy rains! They say they get better traction for the tractors, and under such conditions it requires less power to accomplish the desired results, yet does not pack the soil because it is so sandy. Of course on the richer, blacker, finer sands, the farmer might have to wait a day or two, but even that indicates a soil widely different from most of our citrus soils in California.

Rainfall and Irrigation

Florida's average annual rainfall is between 50 and 60 inches. Approximately half of this falls during the four summer months of June, July, August and September, about uniformly distributed 7½ inches per month. The resultant humidity, accompanied by the high summer temperatures, stimulates the luxurious growth of vegetation in orchard, open field, forest and swamp. The four winter months—January, February, March and April—average about two inches per month, making that part of the year about as dry as California, but with a higher average of humidity and also a higher mean temperature. It is such conditions that favor especially the winter vegetable grower, not to mention the grower of citrus. Even string beans are grown extensively in the winter from plantings made in October and November.

But these rains are not always uniformly distributed and not a few orchards and vegetable fields are provided with wells for emergency irrigation. Fortunately most sections of the state can easily obtain artesian wells. On the banks of the St. Johns river the writer met a delightful grower, S. C. Warner, whose orchard is thus provided with an emergency though seldom used supply which maintains a 14-pound pressure at the ground level. This water is used to supply all needed power for operating his orange packing plant passing through a Pelton water wheel and wasting into the river.

Cultivation and Cover Crops

Many orchards are never cultivated in any way. Probably most of the orchards are disked only, while a few are plowed very shallow as soon as the winter crop is picked.

During the six summer months beginning with May, practically all orchards are abandoned to the growth of either planted or volunteer cover crops of legumes, grass and weeds. The orchardist who does not believe in cultivation usually mows this growth after it is quite mature in October or November. What he cannot reach with a machine he cuts with a scythe and possibly hoes the larger weeds from under the trees. As a precaution against fire he plows a marginal firebreak around each block. Those who do cultivate will disk this growth into the ground and keep the land comparatively well disked throughout the winter. The one who plows, usually disks his orchard before plowing in order to get a better covering of the cut-up vegetation.

Growth and Distribution of Feeding Roots

With the toe of one's shoe the feeder roots of the citrus are easily uncovered, frequently at the very surface of the ground. This is the condition in almost every square foot of orchard soil. One is inclined to wonder if the citrus is not after all naturally a surface feeder by preference. Certainly the shallow cultivation everywhere practiced is prima facie evidence that the Florida grower generally so recognizes it as a probability. The very deepest plowing suggested by any grower interviewed was four inches.

Old Orchards—Large Trees

The writer was very greatly impressed with the wonderful vigor, size and productiveness of many very old orchards, and particularly individual trees here and there in many different parts of the state. Among these specimens, many of them well past 50 years of age, were countless sweet seedling orange trees and selected seedlings budded on both sweet, sour orange, rough lemon and pomelo roots. Seedling pomelos were exceptionally large, and it seemed as if selected sweet orange seedlings budded onto pomelo were largest and most productive of all. Near Fort Ogden in the south-central part of the state, stand eight seedling pomelos from which were picked 400 field boxes in 1894, the year before the severe freeze. A Florida field box holds from 85 to 100 pounds. These trees are from 16 to 24 inches in diameter two feet above the ground, and though miserably neglected since they were frozen 31 years ago, most of them still seem to have healthy roots and strong skeleton tops, and even now give the appearance of trees that would, if pruned, fertilized and given good orchard care, return such yields again.

Near Fort Myers a selected seedling, budded on pomelo root, has a spread of 45 feet, is probably 35 feet high and produces from 35 to 50 field boxes yearly. Of this yield from six to ten boxes are seedling grapefruit produced on a giant sucker six inches in diameter coming from below the bud. It has grown out almost horizontally forming a large portion of that side of the tree. The main trunk of this tree is 20 inches in diameter 20 inches above the ground.

Transplanting a Nursery Tree

In the nursery of W. J. J. Whidden at Bartow the writer asked for a demonstration of young tree planting. This was on October 10. The tree selected was a Marsh pomelo, 18 months old bud, about 1¼ inches in diameter. It was pruned to about 24 inches in height and every leaf and fruit twig removed. After digging it out and shaking the sand from the roots, the taproot was cut to four inches in length and all side roots to about 8 inches, thus giving the root system a horizontal diameter of some 16 inches or 18 inches.

With a hoe Mr. Whidden scraped a dish-pan-shaped hole in the sand about five inches deep, with his finger made a small hole for the end of the tap-root, placed the tree in position, threw a few shovelfuls of sand about it, add two and one-half gallons of water, then a little more sand pressed gently around the tree with his foot and called it planted. A week or two later half an inch of rain fell. Twenty-six days after it was planted the writer and Mr. Whidden visited the tree to note results. Imagine our surprise to find eight inches of growth where there had not been a single leaf or twig! This tree was buded on a new rootstock with which Mr. Whidden is experimenting, and which he has named "Seminole." And these results were obtained in the month of October!

Transplanting Old Orange Trees

It is not uncommon to see orchards 40 years of age, or older, that have been planted so close together and where the trees have grown so large that they seriously shade and crowd each other. The result is greatly reduced crops, often of small size and poor quality. Several instances came under the writer's observation where half of the trees had been removed and transplanted to new ground. These growers claimed that within four years the thinned grove came back to its former yield with superior quality and with the promise of still greater yields of quality in the future.

In one of these cases over 600

of the removed trees were set out as a new orchard. At the end of four years they were as large as eight-year-old young trees and producing nearly as much. Of this number but three or four died, while the rest presented a splendid appearance. Farther down the state James Hamilton was transplanting successfully trees 60 years old.

Root Stocks

In Florida, as in California, there is still uncertainty among many as to just which root stock is best for each different soil type and for the different varieties. The root stocks most commonly used there, as many California growers know, are the sour orange and the rough lemon, the former on fairly low, flat lands where the soil is rather fertile, dark sand, and where the water table may during the rainy season sometimes come within two or three feet of the surface for short periods.

The rough lemon is used on the higher, lighter sand hill sections and where there is little chance of high water table. In such soil the rough lemon has proved to be a vigorous grower, developing a large, productive tree in comparatively few years. This root stock is an excellent forager, distributing its feeding root system over large areas and deeply. Under occasional drouth it suffers probably less than any other well established and known stock. Except in the heavier flat lands it is quite immune to foot rot and gummosis and is quite congenial to most varieties of citrus. But many are finding fault with it as orchards grow older, claiming that the fruit on trees with this root must be picked very promptly once it is fully ripe or it all too frequently recedes from the segments beginning first at the stem end. Another objection is that this stock always tends to produce coarse fruit, particularly while trees are young. Some feel that this can be overcome by the discontinuance of cultivation.

The sour orange root, on the other hand, is so immune to foot rot and gummosis that it can be planted and thrives best where there is always available plenty of moisture not far below the surface, and where the surface soil is evidently rich in organic matter and always damp. Strange to say, on the rolling sand hills before mentioned as the sections best adapted to rough lemon, the sour root is quite often a commercial failure. Perhaps it is deficiency of organic matter, or lack of accumulated moisture in the subsoils under it, but it is no longer used on such soils, as it is likely to dwarf the trees, and so improperly nourishes them that they produce but little foliage and this often of mottled, unhealthy appearance, while the fruit will be sparse and of poor quality.

The sweet orange root is represented most widely by the remaining orchards of old seedlings. As stated previously in these observations many of these are magnificent trees and were reasonably well cared for they are producing excellent crops of high seedling quality. Most of these orchards are over 40 years old and many of them 60 or near that, some older. It is generally conceded that the quality of fruits from trees budded on sweet orange roots is usually very excellent and that the trees are reliable bearers, except possibly for the first few years. These merits are particularly noticeable by comparison with other root stocks in the medium and lighter soils. Some of the thoughtful planters have recently become so impressed with the shortcomings of the rough lemon, despite its health and productivity, that they are turning to the sweet orange and here and there one will find sweet seedlings recently planted in the nurseries especially for such lands. With the present knowledge of the causes and control measures for root and trunk diseases there is a feeling that entire orchards can be kept in commercially good condition if so many old sweet roots in Florida's soils have survived so successfully during the generation when nothing was known of causes and control.

The whole question of root stocks with relation to soil types and varieties of scion is receiving considerable attention by some of the more progressive growers and nurserymen. They are making more careful observation and analysis of the performance of stocks already years planted, and they are experimenting with promising new ones.

On the west coast one new stock in particular is receiving wide attention and has some ardent supporters. This is the "Cleopatra," one of the mandarin group of oranges. Its sponsors claim for it very satisfactory immunity against infectious diseases and observations to date indicate that it is probably adapted to a wider range of soils than either of the two now so commonly used.

Doubtless the most enthusiastic advocate of the Cleopatra was the late E. N. Reasoner, whom the writer met at Oneco, just below Tampa on the west coast, where he and his brother operated the Royal Palm Nurseries for over 43 years. His recent death is certainly a great loss to the citrus grower everywhere. Mr. Reasoner stated that this stock was probably introduced from Jamaica not long prior to 1882. It has apparently made a recognized place for itself in Queensland and New South Wales, Australia, and because of the similar climate of California it should do well here. He exhibited splendid nursery trees of different varieties, both orange and lemon, budded on this stock, but neither here nor at any other place did the writer have an opportunity to see any trees on this root more than two years old, although there are some as old as five years, possibly older.

R. E. Skinner, one of the progressive "second generation" growers of Tampa and Dunedin, is also an enthusiastic believer in the merits and certain future of Cleopatra. He is just now developing and planting some 200 acres or more of young orchards for himself and on this acreage the Cleopatra will be the dominating root stock.

At Bartow W. J. J. Whidden is experimenting with different old and new root stocks, as previously referred to. At Homestead W. J. Krome is taking special interest in the question, just now investigating particularly the possible merits of shaddock. In his district several growers were quite certain that pomelo is the most desirable root stock for that particular section, for all varieties of the common orange, for grapefruit and for lemon. To this, however, Mr. Krome did not fully agree, still feeling that on the light and heavy soils the rough lemon and sour orange respectively are safe to plant. He also had some 5,000 Cleopatra seedlings in his nursery for experimental budding.

It is indeed gratifying to know that such practical efforts are now being made in Florida as well as in our own state to add to our root stock knowledge.

The turning under of green crops contributes valuable fertilizing elements. This green manure not only adds that expensive element, nitrogen, but adds humus. Humus is beneficial in more ways than one as it makes the soil more capable of holding water. It is known that 100 lbs. of sand can hold only 25 pounds of water, 100 lbs. of clay holds fifty pounds, and the same amount of humus or decaying matter holds 190 pounds. This alone ought to convince horticulturists of this green manure, besides the value of the decayed matter providing food for soil bacteria.

In writing advertisers please mention The Citrus Industry.

Citrus Fruits, Cultivation

CITRUS COMMENTS

BY

R. E. Lenfest, Manager Horticultural Department
Orange County Citrus Sub-Exchange, Orlando

Reports from many sections of the state have stated that the bloom was heavy and that the prospects for a crop were good. The recent period of dry weather has caused a rather heavy dropping of the young fruit in some sections. But even with the heavy dropping most observers are agreed that there is a good chance that the crop will be larger than the one for the present season. This being the case it will be the fruit that has the best quality and that has been the best cared for that will stand the best chance of bringing the high price. This will mean that every grower will have to pay close attention to his trees and fruit if he is to have the best fruit that his trees are capable of producing this year.

Rust Mites

Citrus Rust Mite

In order to be sure to be ahead of the rust mites and keep them from stealing a march it is necessary to start during May to look for them and continue to be on the lookout all the time up to within a few weeks of the time the fruit is to be shipped. Many growers have made the mistake of waiting till June or even as late as July before beginning to look for the rust mites with the result that a great deal of damage was done before the grove owner started to look for them.

If many rust mites are found it will pay to spray or dust thoroughly with sulphur. The dusting method will give as good results as the spraying method if the work is thoroughly done when there is little or no winds. However, a wind will also interfere with a good job of spraying. The best results from the dusting method seem to be secured when a second application of dust is given within a week or ten days of the first dusting. This second application is for the purpose of killing all the mites that hatch out of the eggs that were present at the time of the first dusting. During warm weather the rust mite eggs hatch in a very few days and this makes necessary the two dustings close together. If the second dusting is delayed too long then there is a chance for more eggs to have been deposited.

The interference of the wind mentioned above must not be forgotten if good results are to be expected. A suggestion and plan worked out by the entomologists of the Experiment Station and the State Plant Board makes it possible to dust even when there is a fair breeze. It is the use of a light frame work fastened to the side of the duster. It is like using the top and two sides of a box covered with canvas. The top extends out over the trees, one side is next to the machine and the other side hangs loosely from the rear edge of the top so as to allow it to pull up over the trees as the machine moves along. It may be used on fair sized bearing trees and gives quite a little protection from the wind. A hole must be left in the side of the canvas next to the duster to allow the discharge pipe to pass through and also to enable the operator to look through to see what he is doing. A 12 or 15 inch delivery pipe will need to be used as the outfit will have to run close to the trees. After you have checked the rust mites once do not fail to make a regular inspection to make sure that they do not increase in numbers and damage the fruit before you get around to look for them.

The Summer Application of Fertilizer

Each season the problem of fertilizer is just a little different than the one previous and it is generally different than it was at the same season of the year previous. During the past winter and spring there has been more rain than usual. Recently there have been several weeks when there has not been so much rain and the trees in general are showing a somewhat lighter color. This condition of the trees would indicate that the summer application should be increased in amounts unless there was a good increase given in the last application. If no large increase was given the trees in the spring application and the trees are showing light color they may be given an increase of from one-sixth to one-fourth of the regular amounts previously used. If much of an increase is to be given it might be well to split the application and put part of it on now and the rest in July or August. If the application is split the last part may be put on top of the cover crop and not worked in.

The fertilizer should be of high grade materials with at least half of the ammonia from good organic sources such as Bone, goat manure, Peruvian guano, castor pomace. A high grade fertilizer carrying 3 per cent ammonia will fill the needs of most groves. There are some groves where it may be advisable to use only 2 per cent ammonia and still others may require as high as 4 per cent. The average content of phosphoric acid should be about 8 per cent of available. The potash may vary from 5 per cent all the way up to 10 per cent depending on the condition of the trees and also somewhat on the variety of fruit.

Young trees should have a high grade 3-8-5 if they are over vigorous and need to be toned down. If the young trees are normal then it will probably pay to use a good 4-8-3. In applying the fertilizer to the young trees it should be carefully spread and not thrown down in bunches. It should extend from a little way from the trunk out to and just a little beyond the roots so that they will have something to feed on as they grow in length.

Although it is especially necessary to use care in applying the fertilizer to the young trees it is also advisable to spread the fertilizer in the right way around the older trees. It should never be put in narrow bands or rings but should be scattered evenly all over the ground and if the trees are of good bearing age there should be no spots between the trees where there is not an even covering of the fertilizer. This is important if good quality of fruit is to be raised each year. Many times the fertilizer or the season has been blamed for the poor quality of fruit when the main trouble was in the way the fertilizer was applied.

Citrus Men Closing Satisfactory Season

The present season has been a most satisfactory one to the citrus growers of this state, was the statement of Frank L. Skelly, Manager, American Fruit Growers Inc., Orlando, in an interview recently. Net returns to the growers on early fruit up until December 1st were exceptionally high—in fact the highest ever known. During December and January the market was somewhat lower but even during these two months results on the whole were extremely satisfactory. February and March showed a steady advance and prices realized were excellent. At the present time mid-season oranges are practically all shipped and valencias and grapefruit are both selling at exceedingly fine prices.

From the beginning of the season up to April 1st there were moved from this state 10,741 cars of grapefruit, 15,774 cars oranges and 1792 mixed carloads, making a total of 28,307 cars. In all probability there were about 6,000 cars of oranges and grapefruit remaining in the state to be shipped after April 1st. This will make a season's total of 35,000 cars from the state in car lots. A very large amount of fruit has been shipped by express and also a considerable quantity by water from Tampa and Jacksonville. This would probably figure around 2500 carloads.

The possibilities are, that when the season is over the growers will have received in net returns for the citrus crop fully $33,000,000. In addition to the amount received by the growers, approximately $17,000,000 will have been paid out for crate materials, picking, packing and marketing. Besides this it is estimated that the railroads will have received for icing and transportation charges about $20,000,000. Adding these figures it will be seen that the Florida citrus crop this season had a sale value of $70,000,000 or more delivered in the markets.

It may be noted from the above, as a matter of interest, that the railroads this year will receive almost two-thirds as much as the growers receive for their fruit on the trees even with the high prices that have prevailed and with their cost of production yet to be deducted. In normal crop years and with the transportation charges definitely fixed it is

✓ F. L. SKELLY
Mgr. American Fruit Growers Inc.
Orlando

obvious that the railroads proportion would figure much greater. Yet, a car of fruit on an average can be placed in the markets of this country and Canada in less than ten days from shipment, while it requires from the grower approximately twelve months of investment, labor and risk to produce the fruit it contains.

The present Florida crop was short but every indication is that we will have a normal crop next season. If the railroads serving Florida have a proper vision of the future and what the fruit and vegetable business could be made to mean, both to the state and to themselves, they would recognize the fact that transportation rates on perishable products from this state not only should be, but must be revised downward.

In August 1920, freight rates were advanced 35 to 40 percent. Fruit and vegetables, being on a high freight classification, were very seriously affected at that time. It is now generally conceded that an impoverished agriculture means business depression for the nation. We believe that with the immense tonnage of fruits and vegetables which the railroads could have to haul from this state, with proper encouragement to the industry, the railroads should see the benefit to themselves from such a volume as well as to the state and the country as a whole, and that it is up to them to do their full part in a practical way for the encouragement and development of the industry by a proper adjustment of transportation charges to assist in bringing these possibilities to full fruition.

Florida's greatest asset is in her future possibilities. We have thousands of acres of fertile land in this state that can be used in the production of both citrus fruits and vegetables during a period of the year when in most other sections of the country it is impossible to produce anything.

Moreover, within recent years there has been an enormous development in the appetite of the country for these very products. Undoubtedly, there will in any event be a continued increase in the production of both citrus fruits and vegetables in this state and the perishable industry will continue to be one of Florida's chief sources of wealth. At the same time agriculture and horticulture should be given proper recognition and must in the future be given proper assistance and encouragement from every source to produce crops to supply the growing demand and to develop the possibilities to the fullest with reasonable assurance of financial success. The successful development of this industry affects every individual in the country as well as all the collateral industries which supply materials, equipment, or service which it uses.

The estimated acreage in bearing citrus groves in Florida May 1st, 1925, was 253,670 acres, non-bearing acreage 88,749. Some acreage has been put into sub-divisions but the acreage coming into bearing is far in excess of what has been destroyed.

Florida fruit has come to be generally recognized as a distinctly superior product. Large sums have been expended and will be expended in

Continued on page 30

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Cyanogas Citrus Dust is endorsed by State authorities for fumigation against citrus insects in Florida. Do not fail to investigate this remarkable insecticide.

Demonstrations are now being held in the Florida Citrus Belt. Write us for the date and place of the one to be held in your neighborhood. Tell us about your problems; our entomologists will be glad to discuss them with you and tell you how you can use Cyanogas Citrus Dust for profitable results.

Ask for free leaflet 222, which gives full information.

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How About the Real Florida? Did You See It?

Seminole Titbits, a little pamphlet issued monthly by Seminole Plantations Co., of West Bay, Florida, is doing a good work in combatting some of the unfavorable propaganda of the Northern press and Northern knockers. The Seminole Plantations Co., is developing what is probably the largest horticultural development in the state, embracing many thousands of acres of Satsuma, grape, blueberry and other plantings.

The April issue of Seminole Titbits contains the following letter received by Mr. Ernest Pope, president of the company, from a Northern friend, and Mr. Pope's reply. We wish that this letter of Mr. Pope might be read by every Northern knocker of Florida, and for the benefit of the readers of The Citrus Industry we reproduce it in full below:

How About the Real Florida? Did You See It?

"Buffalo, N. Y., March 18, 1926. To the Seminole Plantation Company, New York City: I have received your literature, but you need not send me any more. I thought for a while that I might be interested in Florida, but I have just returned from a trip there and I covered the state from A to Z. Florida is finished. Everybody who has been there this winter sees that. There are thousands of salesmen in the State literally starving. They are giving away their automobiles for a passage home. You had better send your men money to come home on, if you can afford it.

"Coming up, I talked with many people on the train and they all see things as I do. Take my advice and quit. You are wrong. You won't do enough business this year to pay your postage bills. Kindly meant, H. W. S."

"New York, March 20th, 1926. Mr. H. W. S., Buffalo, N. Y. Dear Mr. S.: I have your letter of March 18th. It is intensely interesting, more so than any letter that has come to me in a long time.

"I note your reference to 'starving salesmen' and your recommendation that we bring our men home.

" I am sorry for anyone who may be in such a condition as you describe, but we have no salesmen in Florida, nor have we ever had. As a matter of fact, we only use five men who might be termed 'salesman,' and their time is mostly taken up in seeing people who have expressed an interest in Seminole and desire more information than we can give through correspondence.

"I also note your prediction that we will do no business in 1926. The fact is we did a good business in 1925, but our business from January 1st, 1926, to March 20th, 1926, is 73.4 per cent more than for the corresponding period of last year, and the indications are that this increase is going to be at least maintained, provided we can take care of the business. However, our work in clearing land, planting and cultivating, requires a continual increase in labor, housing and equipment, and we are necessarily limited in what we can accomplish in a year.

"Even if we should not secure any more new business in 1926, we have enough contracts on hand to keep our present force of approximately 200 men busy for the year, and in the event of such a condition it would enable us to catch up somewhat in our housing which would not be bad for us. We have built 31 cottages at our general headquarters to take care of our employees and need to increase this number to 150.

"I note you have 'gone over Florida from A to Z' and that you consider Florida 'finished.'

"This is rather a broad statement.

"I wonder if in going over the state so thoroughly you visited the truck and fruit growing areas of the south central section along the East Coast, the winter truck and fruit sections of the Manatee country, the beautiful fruit sections of Polk County and the fruit, vegetable and general farming sections of the highlands of Central and West Florida.

"If you did this I would like to know whether you saw these truck farms dilapidated and deserted and the owners despondent, or, as you must have made your trip during the shipping season of winter vegetables, did you see workers in the fields gathering and packing the various products, and did you see long strings of cars at stations being loaded with these products and other long strings of cars waiting to be loaded?

"Did you talk with these farmers, provided they would stop their work long enough to talk, and have them tell you of making net profits per acre of $1,500 to $2,000 on celery, $2,500 per acre on tomatoes, $500 to $2,000 per acre on various other vegetables?

"If you visited the fruit growing sections did you find the groves and vineyards ill kept and bare of fruit or did you see thousands of workers gathering, packing and shipping the orange crop?—I rather think you saw the latter condition.

"Also, I wonder if you saw the great phosphate mines, one of Florida's many virgin assets—the output from which before the World War went largely to enrich the fields of Germany and make them the most productive lands in the world, and is now being turned back into the fields and groves of Florida itself?

"Did you happen to see in your travels any of the enormous pine and cypress lumber mills that dot certain sections of the state, many of which ship individually each day, whole train loads of lumber to other parts of the country and world?

"Did you visit at Jacksonville and Pensacola the rosin and turpentine yards and see there unbelievable quantities of this valuable product from Florida forests.

"I doubt very much that you went west of Live Oak through the northern section of the state, through the great farming district where you can see the most modern of dairy farms with the finest breeds of cattle, and prosperous general farms where they raise almost everything from peanuts even to alfalfa.

"I also wonder if you went west of the Apalachicola River into that old and still new section, Western Florida, where you see large plantations that date back to slavery times, and large new developments that are being carried on in a quiet substantial way and of which you perhaps never hear, but may come upon unexpectedly in your trips across country. And did you visit the St. Andrews Bay section of Bay County with its great natural beauty, whose fertile soils are now being turned to supplying the needs of humanity?

"I would like to ask if you happened to take note, at the transportation gateways of Florida, of the great trainloads of these Florida products going out daily—something like 500,000 carloads each year—to markets

north, east and west?

"With reference to the people you talked with on your train trip north, I would like to know if you talked with any of those prosperous fruit and vegetable growers that I mentioned above. I doubt it, as they are more likely to be busy at this time cashing in on their season's crop. If you should happen to be down in July and August you would see many of these people coming by train and automobile to the mountain and lake regions of the north, but I don't think they would tell you that they consider Florida 'finished.'

"I might also ask if you talked with any of the thousands of people who own and have owned winter homes in Florida for many years, and who stay here from fall until spring, not so much to make money but to live. I doubt your having seen any of these people on your train.

"Mr. S., I am frank to say that I am afraid that instead of seeing Florida from 'A to Z' you really saw nothing between 'A and Z.'

"If you go down next winter—even if you do think winter is the best time to see Florida—perhaps the 'Lots for Sale' signs will not then be so thick as to obstruct your vision and you should be able to see something of the real fundamentals of Florida's present and future prosperity. Yours very truly, Ernest Pope, President."

THE NET RETURN PROBLEM

Continued from page 13

portant than the selection of a wife. Yet many say the selection of a wife is the greatest lottery of life, as you can't have but one choice, at least at a time, unless you commit "citrus bigamy" as I did in my decision a year ago.

If this discussion should tend to eliminate that tendency each of us has to argue most emphatically and bitterly the things on which we have the least positive evidence of proof, the question asked has been worth our consideration.

There is much for all growers to learn by open mindedly comparing notes and being absolutely frank with each other on their marketing problem. They should compare from the original document sizes, dates when shipped and the market fluctuations at a similar period, or individual sales with individual sales on a similar date. But the more you dig into it, it is my experience that the more tolerant will be your conclusions in jumping to any decision that you would have done much better elsewhere. Such comparisons will help greatly in arriving at a sound decision but you will still have to be guided by the general reputation of the organization considered and its general sales machinery used for distribution. The wider the experience the less I think will be the partisan attitude and the more will grow the belief which I consider true—that Florida offers many efficient marketing mediums manned by leaders of high purpose and real ability.

"QUICK BREAKING" OIL EMULSIONS

Continued from page 12

reality, is their greatest safeguard. The young on emergence are brought in contact with this oil film and are either killed, or are prevented from settling down and soon die. This accounts for the fact often observed, especially in the case of Red Scale, of an apparent increase in mortality as time goes on.

In addition to its value as a scalecide, this type of oil (white oil) offers an excellent control for most other insect pests in Florida, such as White Fly, Red Spider and Rust Mites, and the grower has the added incentive of controlling both pests with one thorough application of spray.

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V-C Fertilizers made for Citrus furnish the plant food required for spring and summer growth of the tree and the development of the fruit.

V. C. Fertilizers are known to the leading grove owners of Florida which is the best testimonial of their value.

Ask your dealer or write

Virginia-Carolina Chemical Co.
Manufacturers of V-C Fertilizers
Jacksonville, Fla.

RANDOM REMARKS ON THE FERTILIZATION OF CITRUS TREES

Continued from page 11

plied over a wide area within reach of roots. Do not confine it to a little circle around the tree, but from the extremities of the limbs outward, as far as the roots extend. Get the tree to pasturing on a wide area by wide distribution of food material.

Lastly, but by no means least, look well to the cover crop. Cow peas, beggar-weed, crab and other grasses, On our pine lands it is very necessary to build them up with moisture-holding, food-making, life-giving vegetable matter. Do not allow your land to lie unshaded and unmulched for the summer sun and rains to burn up and wash away.

Starve the fertilizer man all you can by raising a good portion of your plant foods by cover cropping. Some regard Natal Grass as almost a misfortune in a grove, but I am thankful that we have the Natal Grass. It thrives in almost any soil, is soon reduced to humus after mowing, making lots of it; it does not make hard hoeing and may be easily eliminated when you wish to do it.

Fertilize liberally and watch results closely. Feeding may be carried to excess, and consequent results are harder to correct sometimes than those from starvation, but that does not justify the latter.

Finally Brethern (when necessary) let us (s)pray.

CITRUS MEN CLOSING SATISFACTORY SEASON

Continued from page 26

advertising Florida products, not only in this country but in foreign lands. Export business, particularly on grapefruit, amounts to a consequential volume with every reason to anticipate a continued consistent increase, and that within a reasonable period Florida citrus fruits will be available in season in practically every civilized country in the world.

JUNE 7-12 DATE SET FOR CLUB BOYS' GATHERING AT COLLEGE OF AGRICULTURE

Gainesville, Fla.—The week of June 7-12 has been named by the Agricultural Extension Division as the date of the annual Boys' Club Short Course to be held at the College of Agriculture, according to an announcement here today by R. W. Blacklock, boys' club agent. It is expected that more than 100 boys from nearly every county in the state will spend that week at the University.

The week selected is also commencement week at the University of Florida, and one of the attractions for the club boys will be the graduating exercises at the state institution. Most of the week will be spent in a course of study conducted under the auspices of the Agricultural Extension Division, Experiment Station, and College of Agriculture.

In spite of the fact that climatic conditions have been unfavorable for the boll weevil during the last two years, the number of boll weevils entering hibernation at various points in the Cotton Belt last fall was more than in any of the previous years, except one, for which records are available. Weevil hibernation this winter is decidedly above the normal average. This is shown by studies which the Department of Agriculture has made at points in Louisiana, North Carolina, South Carolina, and Georgia.

Considerable success has attended the experiments of the United States Department of Agriculture in the use of the airplane as a means of distributing poison dust over both treeless and wooded swampy areas for control of malaria mosquitoes. In the final tests more than 99 per cent of the larvae in the area treated were destroyed with one application. Paris green was the larvicide used in all the experiments.

One hundred and fifty new members a month is the average number of livestock owners joining the "Better Sires—Better Stock" campaign fostered by the Bureau of Animal Industry, U. S. Department of Agriculture.

Eggs are a balanced diet, rich in protein, fats and minerals.

"Everything Needed for Spraying and Dusting"

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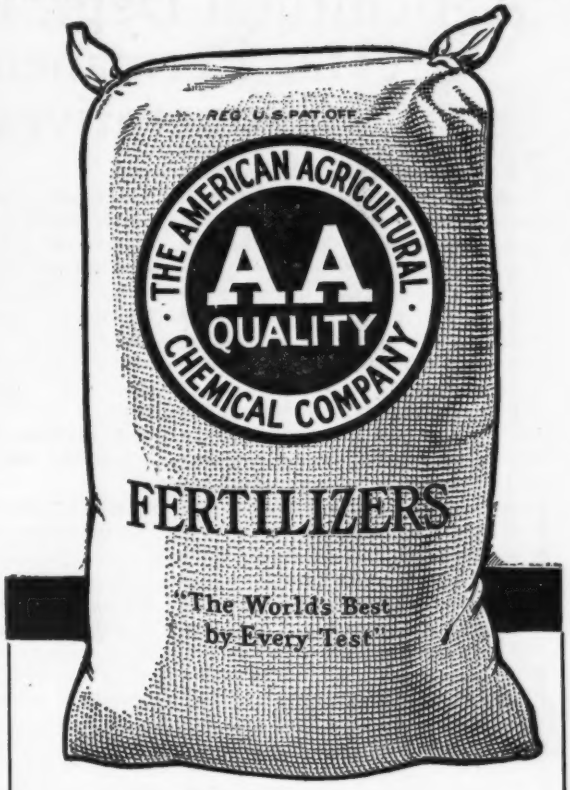
Florida Fruits and Flowers

Bartow, Fla.



Exactly right for citrus trees

Any old fertilizer will not do for citrus trees—they must have fertilizers that are made especially for them, fertilizers that contain the exact plant foods that these trees need for healthy growth and big yields of ripe, juicy fruit.
Take no chances this year. Use the fertilizers that have been proved best for citrus trees.

BRADLEY'S and COE-MORTIMER

Special Citrus Fertilizers

are strictly "AA Quality" Fertilizers. Fifty years of experience are back of them.
They not only give your citrus trees exactly what they need, but provide these plant foods in forms that are readily assimilated by the growing trees.
Use these brands and you can be sure you've used the best.

"AA QUALITY" FERTILIZERS

Manufactured by
The American Agricultural Chemical Company
Byrne Bldg., Jacksonville, Fla.

Agricultural Dept. Predicts Greater Permanence of Cooperatives

Figures which roughly indicate rates at which farmers' cooperative associations have gone out of business, have been compiled by the United States Department of Agriculture. A total of 11,920 reports were available for the study, of which 1,117 were from associations which had gone out of business prior to December 31, 1925.

Percentages have been worked out for those groups for which enough reports are available to be considered fair samples. The department believes that while these percentages hold good for the past, probably they will not be true for the future, inasmuch as fewer associations already in existence are assured a longer life as management is becoming more efficient. Already the death rate is low in sections where farmers have had considerable experience with cooperative enterprises, and it is believed that ten years from now it will be even lower.

Reports from 1,376 associations formed for the purpose of collective buying for farmers, including farmers' cooperative stores, indicate that 14 per cent had gone out of business prior to 1926. The rate for fruit and vegetable marketing associations is 13 per cent: miscellaneous products 12 per cent; dairy products 10 per cent; grain 8 per cent, and livestock 4 per cent.

The low percentage for livestock is attributed to the fact that inasmuch as shipping livestock requires little in the way of an organization and capital, many of the efforts along this line have not been reported to the department. Morover, the cooperative shipping of livestock is such a simple matter that the technique of this form of marketing is easily mastered.

Rates have been determined for the nine geographic divisions and for a few of the States where there are many cooperatives. The rate for the United States as a whole is nine associations out of business for each 100, or 9 per cent, for which reports have been obtained. The rate for the North Central States is 7 per cent; Middle Atlantic and Pacific States 11 per cent; South Atlantic States 14 per cent; East and West South Central States 15 and 16 per cent respectively; New England States 18 per cent, and the Mountain States 23 per cent.

The lowest rate of failure is in the States where the largest number of associations are found, and where the agricultural colleges have given considerable attention to improving the technique of cooperative marketing. The rates for a few of the States in which cooperative activity has flourished are : Minnesota, 8 per cent; Iowa, 6 per cent; Wisconsin, 7 per cent; Michigan 9 per cent; Nebraska 8 per cent, and Illinois 6 per cent.

PREVENT DECAY OF TREES BY DRESSING PRUNING WOUNDS

Citrus Fruits Pruning

All wounds made by pruning which are above one-half inch in diameter should be protected from decay by some means.. Limbs should be cut off so that no stub is left. The wound should be promptly covered with a good lead paint or other protective dressing, according to horticulturists at the College of Agriculture, University of Florida.

Such a dressing, which has shown considerable merit and will last considerably longer than paints in our climate, is made of the following materials: I pound resin, 2 ounces tallow, 1 ounce spirits of turpentine, and 6 ounces wood alcohol.

Melt resin and tallow together. After cooling somewhat, slowly add alcohol and then turpentine, stirring continuously.

The mixture will harden on exposure to air and should be kept in a wide-mouthed, tightly corked bottle. Apply with a brush.

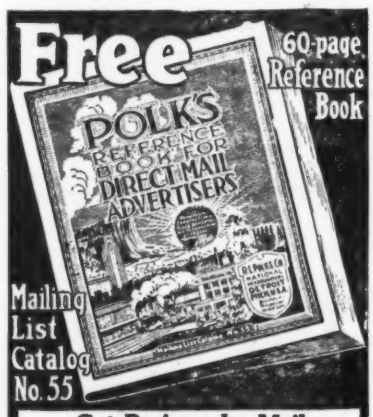
Large wounds which were covered two years ago with this dressing have shown no decay whatever and the dressing itself appears as intact as the day applied.

Superior to Shock Absorbers
Spring Control
For FORD Cars — ECLIPS — Per Set 650 Complete
Order Today
Agents Wanted Everywhere
The Eclips Co. 1711 Hertel Ave., Buffalo, N.Y.

Consider now ordering Fertilizer for summer application
"SIMON PURE AND GEM CITRUS BRANDS"
"Time Tried and Crop Tested"

	Ammo.	Potash	A. P. A.
Simon Pure No. 1	4	12	6
Gem Fruit & Vine	3	10	6
Gem Citrus 4-12-6	4	12	6
Citrus Special 2-10-10	2	10	10
Fruit & Vine 5 Per Cent Special	3	5	6
Citrus Special 4-8-8	4	8	8
Gem Orange Tree	4	6	5
Gem Tangerine	5½	12½	7½
Satsuma Special	4	6	5

Get new price list, order early, QUALITY first, FAIR PRICES, PROMPT SHIPMENT. Thirty-five years manufacturing fertilizer for Florida growers. Liberal cash discounts.
E. O. Painter Fertilizer Co.
Jacksonville, Duval County, Fla.



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European Plan, Fireproof 300 Rooms With Baths
THE CENTER OF TAMPA

ECHOES OF THE HORTICULTURAL SOCIETY'S MEETING

Continued from page 15

Marvin H. Walker, in his newer capacity as editor of The Florida Grower, was showing keen interest in the proceedings, and greeting many old friends.

J. G. Grossenbacher, of course, was among the important ones very much present.

Roy E. Lenfest as usual was honing for knowledge, taking in all the talks and examining carefully all the exhibits. No wonder he has accumulated such a remarkable horticultural knowledge.

Earl Haskins of Winter Haven, accompanied by Mrs. Haskins, was present and taking a great deal of interest, after an interlude of real estate activity. Earl and Mrs. Haskins were working strongly to have Winter Haven designated as the next place of meeting.

Bradenton was very much on the job of trying to be the next meeting place. The campaigning of the accomplished Misses Underhill of that city was artful and effective.

Harry S. Borland of Ocala was holding down his accustomed place in the corner.

C. G. Bouise of Baltimore, Bartow, Yalaha and way stations, was there with his perennial pad and pencil. It is well never to make a statement in his presence which one is not prepared to prove, or his notes may arise to confute a year or so later.

W. J. J. Whidden of Bartow was ready with considerable information on citrus root stocks at any time.

K. E. Bragdon of Winter Haven brought his moustache to the meeting, not to mention his monumental intellect.

Alfred Warren of Fort Pierce told us there was a possibility that St. Lucie County, while making an exhibit, would not compete for prizes at the next South Florida Fair at Tampa. After winning the grand citrus prize at Tampa for eight years straight St. Lucie men feel as if they are rather making themselves unnecessarily prominent.

However, we hear that Brevard County may go after that prize in earnest next year. In that case there will be some warm competition.

L. A. Hakes of Orlando loaned his presence to the latter part of the meeting, having been compelled to miss the first part because of Exchange elections.

A. B. Michael of Wabasso was a thorough-going participant in the meetings, while greeting a wide circle of friends and acquaintances.

S. H. Poole of Lake Alfred was active as usual in the society's affairs, and in the discussions.

The floral exhibit in the south parlors of the hotel was both beautiful and interesting.

Professor E. L. Lord of the College of Agriculture at the University followed his normal bent of being everywhere at once and doing about three times as much work as any other individual to make the meeting successful.

Dr. J. H. Montgomery who has charge of protecting Florida from invasion of harmful bugsects from the outside was on hand to give sought for information concerning the quarantine regulations.

Mr. Hart of Hawke's Park, the originator many years ago of Hart's Late, was the oldest man present in point of years. He was one of the society's founders and, we believe, never has missed a meeting.

The foregoing are just a few high spots which come to memory. In addition there were a lot of important folks present who slip our mind just now. We recall, however, missing the faces of Lem Woods, Collins Gillett, Lorenzo Wilson, and some others we should have liked to see. After all, while there is a lot of valuable information to be gathered at one of these meetings, its the human contacts which count most.

Hogs are still bringing a good price. Plan to save every pig farrowed during the spring and then keep it growing until it is large enough to market.

Now is the best time to spray for white flies during the month of May so as to kill the new hatched flies as this is the weakest point in the history of the insect.

Armour's

BIG CROP
Fertilizers

"Makes Every Acre Do Its Best"

Summer Citrus Fertilizing

More damage to fruit and growth can come from omitting this application than any other.

Two crops are influenced by the summer application—the one now set and the one to follow.

If food is lacking, the percentage of drops will be large, and the fruit that reaches maturity will likely be small in size and inferior in quality.

Also, if you omit this application, very little new growth will be made during the summer on which to hang your next crop.

A heavy crop of fruit is now set. The more you can hold and develop into desirable, uniform sizes, the greater your profit.

A low cost to produce a box of quality fruit is the greatest profit insurance you can take out.

Armour's
Big Crop Fertilizers

Contain the food your trees need. Four distinct types of highest quality citrus mixtures from which to select. Several anaylses in each type. Among them there is one to suit the summer needs of your grove exactly.

Let an Armour's BIG CROP brand be your choice this summer. The fruit you gather at picking time will prove the wisdom of your choice.

Booklet free

ARMOUR FERTILIZER WORKS
Jacksonville, Fla.

THE GROWERS' OWN PAGE

This department is devoted to the growers, for their use in giving expression to their views and a discussion of growers' problems. Any grower is welcome to make use of this department for the discussion of topics of interest. The only requirements are that the articles must be on some subject of general interest, must be reasonably short and must be free from personalities. The editor assumes no responsibility for views expressed, nor does publication imply endorsement of the conclusions presented.

WANTS BETTER MARKETING METHODS

Winter Haven, Fla., May 1st. 1926

Editor, The Citrus Industry:

I have recently read with much interest numerous long and interesting articles on the citrus situation containing information which shows considerable study, research, learning and knowledge, on the part of the author, being particularly valuable from an educational standpoint, but of what special advantage is it to the grower to know the original derivation of the Orange? How much more important to spend our time trying to devise some practical plan for selling our fruit always at a satisfactory price. This has not always been done and there are prospects of having trouble with next season's crop.

The Fruitman's Club has put in motion a good thing in the shape of advertising. This is a good step but it is only a step and will not avail much unless some practical method is worked out to sell our fruit always in a satisfactory manner. Optimism is a glorious thing when backed up with facts and honesty but gross exaggeration is never successful. It is bad enough to fool others but still worse to deceive ourselves.

You kindly published an article of mine in which I asked the readers for their criticism. As no one has shown any disagreement the presumption is, that there is some truth in my article as "silence gives consent." If so, there are some important matters which need attention of decided nature at an early date. Furthermore the leading agricultural journals of the state say that in the main they believe that I am right. If I am wrong that article of mine should not be permitted to go unchallenged.

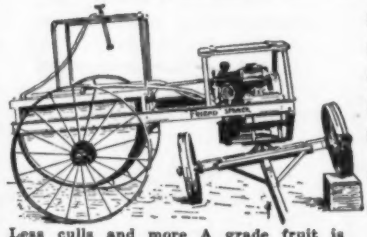
Citrus had a financial disaster in the years of 1922 and 1923 because the marketing machinery was not competent to sell the fruit at a profit to the grower. There was demoralization among the different selling organizations and the growers got it in the neck. There is prospect of a repetition of the disaster during the next season as there seems to be no change of any momment in marketing methods or personnel.

One party says that this advertising which is proposed will profit the grower very little unless we are farsighted enough to direct some effort at avoiding glutted markets. Mr. George M. Chapin of Jacksonville in the Manufacutrers Record declares that the state is not exploiting citrus fruits properly and that no adequate provision is being made for the marketing. None of us loses anything by consideration of the other fellow's viewpoint or are we like the old French lady who said: "I do not know how it always happens that I meet with nobody except myself who is always in the right."

The sad plight of some co-operatives is due more than anything else to the fact that some men who have been placed in positions of leadership do not fully understand that they are acting not for themselves but for the thousands of growers. A co-operative to be successful must have the real spirit of co-operation in all its dealings with all its members. There must be thorough mutual confidence between the members and its management. The management must not forget that the co-operative belongs not to the people who have been employed to carry on the business but to the men who produce the commodity it deals with. A co-operative can succeed only when its leaders have the whole-hearted confidence and support of its members. Some of our co-operatives have hard times but there is still a good chance for all of them provided they recognize their shortcomings and are willing to correct them, but they will never succeed without efficient business systems.

A co-operative with a small minority of the total product cannot be much of a factor and its future is

SPRAYING FOR PROFITS



Less culls and more A grade fruit is the shortest route to bigger profits. One big factor in producing quality fruit is spraying.

"Friend" sprayers give long, dependable and efficient service under all conditions. Producing an abundance of high pressure at low unkeep cost makes "Friend" the choice of careful buyers.

Hand sprayers for gardens etc., traction and combination outfits for field and potato spraying, and large and small power outfits ranging from 5 to 30 gallons per minute capacity are included in the "Friend" line.

Power outfits furnished in regular cut under, short turn type or in bed type mounted on low down wagon style truck as preferred.

15 REASONS FOR BUYING A "FRIEND"

1 Low down—easy to fill; cut clear under—extreme short turn; low center of gravity—will not tip over on steep hillsides.
2 Weight of solution on high wheels—easy draft.
3 Tank made of best quality, knot free, Cypress.
4 Direct propeller agitator—no gears, belts or chains to loosen or break.
5 Motor and pump in one unit—stress self-contained compact and light.
6 Straight gear transmission—no chains or belts to break, loosen or slip—no loss of power.
7 Dual cooling device—motor does not overheat.
8 Dual lubrication—drip and splash. All moving parts submerged in deep oil bath on big 20 gallon per minute outfits.
9 Simple, powerful, durable pump; Hyatt High Duty Roller Bearings on Jackshaft.
10 Adjust packing with one finger while pumping at high pressure.
11 Remove only two screws to replace plunger tube and packing.
12 Loosen only one screw to remove valve cage and seat.
13 Handy valve lifters for loosening intake valves if stuck, and drain plugs on all valves.
14 The "Friend" Spragun, the only real Spragun, sprays fine and wide, medium or extremely high or instantly shut-off, all with a slight turn of the controlling valve.
15 All "Friend" parts made of the highest quality materials obtainable, and extreme simplicity throughout means long life and low upkeep. All parts easy to "Get At" to adjust or replace.

There are many more reasons

Send for Free Catalog Today

"Friend" Manufacturing Co., 114 East Ave., Gasport, N. Y.

Some of our Florida dealers are:

R. W. A. Duncan, Frostproof.
West Coast Fertilizer Co., Tampa.
Chase & Company, Sanford.
Peninsular Chemical Co., Orlando.
Thulberry Brothers, Lake Wales.
R. C. Allen, Auburndale.
Franklin Hardware Co., Ft. Myers.

If your aim is to produce Better Fruit and Bigger Profits use a "Friend" Sprayer and a "Friend" Spragun.

very doubtful, if indeed it does not spell disaster. Its success will depend in the long run on the confidence it is able to inspire in its members and the satisfaction they get out of their membership. If an association cannot give proper service, cannot get more for a member's fruit than he could in selling otherwise, there is no reason for its existence. That is all the association exists for—to sell the fruit at a better advantage and to get more money for the growers. If it cannot do this, it will fail.

There has been a great deal in the papers lately about taking inventories. Why not take an inventory of citrus, particularly in regard to methods, policies and personnel. Let's find out if our methods and policies are right. Let us determine if our leaders may be safely depended upon to lead us out of the wilderness.

The Tri-state Tobacco Association of Kentucky had a committee of capable and dis-interested men to go over its affairs with thoroughness and tell the members exactly what they found. This committee found things to praise and things to condemn in the management of the association. Why can't the Exchange do likewise, thereby finding out the weaknesses and correcting them so that the growers will have confidence in the organization. If we find that we need new methods or new policies, let's have them. If we need new leaders, let's make a change. It doesn't matter what a competent leader costs. If he is really competent he will be worth the price. A few extra thousands paid in salary will not count if he brings in extra millions.

Citrus is decidedly the biggest industry of the state, upon which depends our prosperity. So it is the duty of every citizen to take an active part in arousing the people to the urgent necessity of seeing that the proper organization or organizations are built up here in Florida to properly care for this industry, an organization which will command the respect and confidence of a large majority of the growers. Less than that is only a makeshift, spelling failure.

Let everyone take off his coat and go into action right NOW.

Very truly yours,
Martin Lane.

CITRUS—AND OTHER THINGS

Editor The Citrus Industry:

It is raining today, and as I have been asked so many times of late why I don't write more for publication, I will take advantage of the weather to scribble a few lines. Somehow many seem to like what I write, or else its the way it's written, after a crude western fashion. That may be it. Anyhow, they call for more.

The year 1926 has been hit hard by the loss of two such men as Luther Burbank and our own beloved E. N. Reasoner. Both are gone to the Great Beyond, for this is not all of life, and I miss them much more than I can tell. I knew them both, and to know them was to love them and the work they did. But, after all, they were just human beings and prone to make mistakes. Oh, we all make mistakes, and the great plant wizard made his. I am sorry, but knowing him as I did, I can't believe that he meant what he said, at least not the way it sounds to a layman, so let us remember him for the beautiful things he gave us, the same as we do our beloved Mr. Reasoner.

Well, well. I have wandered off from citrus culture and other things I was going to write about. One of the other things I would mention is the pineapple. Many years ago I called the attention of the secretary of agriculture to the fact that the wild pineapple plant was immune to the wilt that has and does still injure the smoother Cayenne plant. So I suggested that the department try

LYONS FERTILIZER CO. ORANGE BELT BRANDS TAMPA, FLORIDA

FERTILIZE YOUR GROVE EARLY

Splendid crop of fruit setting, and with such early rains, we would advise early application of fertilizer with a view of not destroying the cover crop any more than necessary.
The real interest in the grove business is just beginning. Therefore, you should take the best care possible of your grove and endeavor to raise the highest grade of fruit. Of course fertilizer is important. We, therefore, recommend the use of

ORANGE BELT BRANDS

Manufactured By

LYONS FERTILIZER COMPANY

Citrus Exchange Bldg.

Tampa, Florida

"QUALITY FERTILIZER for QUALITY FRUIT"

its hand at crossing these two plants so that we could have the Cayenne on the wild plant. This, I am sure, can be done. So I sent the government wild plants and also some of the tame. The department invited me to join in the experiment. As I thought it would take at least ten years, I felt that I was too old at the time to join in the undertaking. However, I did make the start, but the rats destroyed all my work in one night. Then I went West and had a long talk with Burbank on the subject. He agreed with me that it could be done and I think so yet, but apparently the government made no headway. So the dream of my life has never come to fruition, more's the pity. I just mention this for the benefit of the pine growers. Some time some of you may take it up and complete the job.

And still it rains
Alike on the fields of the farmer,
Alike on the streets of the town.
Oh, it has no respect for the person,
It regards not the Judge or his frown.
It bespatters the rages of the slum
Just the same as the silken gown.

And it weights down the young growth on the citrus trees and how pretty they look with their wealth of bloom, young fruit and growth. If you can be content with just a citrus orchard, you can have that in California. But if you want to own a real citrus grove, you can have that alone in Florida, and it seems to me there can be nothing prettier than a real citrus grove in Florida. You will pardon me, I trust, if I insinuate that the "Rancher of Rancho Glen Haven" has one of them, seven years old, or nearly so, and setting the sixth crop of fruit and I have had to prop them up each year and you cannot find a scale or hardly any other pest on them. And the Rancher feeds them potash with a liberal hand. Some of you may not know that scale hardly ever infest a potash fed grove, but such has been my experience, and as for the fly, I care but little for him. The fungus and the spray I use take care of him.

And then comes the green aphids. Well, they bother me but little, for the fungus I use for the white fly attends also to the aphids. And then, I do not worry my trees too much. I let them have more their own way, trusting them to have more tree sense than many give them credit for. And they pay me in kind and pay me well in bountiful crops.

And so the Rancher goes his way
From early morn till close of day,
For what is mine shall come to me
And for what is not, I shall not long.

B. M. HAMPTON.

FIGHT THE CITRUS APHIS BEFORE THE INFESTATION GROWS

Gainesville, Fla.—The citrus aphids are increasing over the state and in a few places have reached dangerous numbers. In most groves only an occasional tree here and there shows a colony. These colonies, however, often contain very many aphids. These scattering colonies of aphids can be dealt with very effectively and cheaply and measures should by all means be taken to keep the aphids from increasing and spreading, says J. R. Watson, entomologist for the Experiment Sattion.

It is much easier to treat one tree now than 200 or 300 in a few weeks. Owing to the unusually dormant condition of the trees during the winter and the active measures of most growers to push growth early, it now appears probable that in most groves the early flush of growth will get by without any material damage from the aphids this season, but trees putting out late, and especially tangerines, are liable to suffer severe damage and growers are urged to take careful measures to stamp out these incipient colonies. This will be much cheaper than a general spraying or dusting.

At the present time the cheapest and most effective way to deal with these aphids is to dip them with a good contact insecticide. Most of the colonies are on young trees and on the ends of the branches. These can be bent over into a bucket containing some good insecticide. Perhaps some of the best insecticides for this purpose are a solution of soap and nicotine sulphate at the rate of about one-half ounce of soap or a gallon of water and a teaspoonful of derrisol.

The Agaves, or Century Plants, are the most striking and are lovely in our Southern gardens when used in combination with the Bamboo. They grow on very sandy soil they can be planted in a great variety of places. They are mostly used to secure very formal effects, and can be used singly or in groups.

USE "BLACK LEAF 40"

It gives you Extra Insurance Against Aphis

Take advantage of this 2-fold control. When you spray with "Black Leaf 40" you kill Aphis and Thrips, not only by direct contact (or hitting) but also because of the "gassing" effects of the volatile Nicotine fumes which arise through the trees. Likewise, when you dust with Nicotine Dust, insects are killed by actual contact of the dust with their bodies and also by the powerful nicotine gas.

Ask Your Experiment Station

Tobacco By-Products & Chemical Corp.
Incorporated
Louisville, Ky.

"Black Leaf 40" Kills Aphis
40% Nicotine

Mid-Summer Fertilization

Hunt Bros. citrus service, at Lake Wales,, gives the following suggestions and timely advice on fertilization during May and June:

Hunt Brothers are now hauling and applying fertilizers to those older groves which were not fertilized early this spring. Groves are generally fertilized four times per year for the first two or three years. After that they are generally fertilized (in the Sand Hills section) three times per year. After groves have attained considerable age it is possible to cut down the number of fertilizations to two a year. This does not mean that the amount of fertilizer given the tree is cut down, but that the total amount to be given during the year is put on in two application rather than three. Suppose that a tree needed eight pounds per application, that would be twenty-four pounds per year. Were this tree to be fertilized but twice, it should receive twelve pounds per application.

When a grove is fertilized three times per year the applications are generally put on about the last of November, the first of February and the last of May. Groves fertilized but twice are generally fertilized about the last of November and the latter part of April.

A number of Hunt Brothers' groves are in the two fertilization Spring application. This will have to be a heavy application for several reasons.

First, the trees are a year older than they have ever been before and the older the tree the more fertilizer it needs.

Second, the groves have bloomed heavily and for the most part have quite a heavy crop of fruit set. A tree with a heavy crop coming on needs more fertilizer than one with a very light crop. Last year most of these groves had a light crop set so that this application will seem quite heavy as compared with that of last year.

Third, the heavy rains that we have had this year have made all the fertilizer in the soil available. That which has not been taken up by the tree has been leached out and is gone forever so far as the tree is concerned. The situation is unsuual for this time of year. As a result of the abundance of moisture in the soil the trees have made a splendid growth and have set a good crop, and now have about exhausted the food supply. It is necessary, therefore, to give a liberal application at this time to sustain the growth made, nourish the large crop of fruit set, replenish the soil fertility which has been largely leached away and provide vegetative growth in June on which will come next year's bloom.

he fertilizer used for the May or June application should be quite different from that used in February or March. Early in the season quick acting sources should predominate for in the ordinary season spring is a period of drought when quick acting sources are needed. Not being prophets we must be guided by the weather that we can reasonably expect.

Ordinarily, our summer season is our rainy season and it is important that our fertilizer be from slow acting sources not readily leached away by the summer rains. As a general thing, the spring application is rather high in ammonia and low in potash while the May application is high in potash and lower in ammonia. Neither potash nor phosphoric acid is readily leached away so that the same sources can be used for these elements the year around.

GULF
Brands

has a more significant meaning than just fertilizers. It means QUALITY both in goods offered and service rendered

THE GULF FERTILIZER CO.

603 CITIZENS BANK BLDG. TAMPA, FLA.

SOIL BUILDING AND SUMMER FERTILIZERS—1926

Continued from page 7

no stubs. Pruning is not a routine job. It requires thought and good judgment to get the best results.

Treat gummosis spots on the trunks and limbs of affected trees. Clean the dirt away from the crown roots of trees showing foot rot. Remove the diseased tissue in the affected parts and paint with Protexol.

Hoe around the fences and around the bearing trees to keep down the growth of grass and weeds. Plow a fire line around the fence where possible to prevent fire reaching the grove.

Fertilize the young trees in September.

Disease and Pest Control

The work of producing good fruit is only partly done when the trees are provided with favorable soil conditions and have been properly fed. Good fruit in the average bearing grove can be had only by proper control of the diseases and pests that injure the tree and mar the fruit. Like pruning, proper spraying requires thought and thorough work.

THE FARMER'S PROBLEMS

It's 5 o'clock out on the farm,
The cock begins to crow;
The farmer yawns and moans and groans
For he knows it's time to go.
The hungry pigs begin to squeal,
The cows begin to low,
The guineas pierce the morning air
With noise where 'er they go.
The old mule with his loud hee haw
Gives orders for his oats.
Contented sheep and lambs nearby
Are grazing with the goats.
The old duck gives a low quack, quack,
And holds his head erect.
The goose comes 'long and shouts, "Honk, honk,
I've found a nice insect."
The turkey proudly struts about
With colors ever new.
The faithful dog, a good old pal,
Is guardian, tried and true.
Old Felix walks with stealthy tread
Among the orchard trees;
While honey's gathered from the Flowers
By busy little bees.
The waving fields of grain alone
Would make another song;
But should I try and tell it here
This poem would be too long.

—Clarence A. Bass, Ft. Pierce, Fla.
and T. DeWitt Taylor, Shiloh, Fla.

In writing advertisers please mention The Citrus Industry.

CLASSIFIED ADVERTISEMENTS

The rate for advertisements of this nature is only five cents per word for each insertion. You may count the number of words you have, multiply it by five, and you will have the cost of the advertisement for one insertion Multiply this by the total number of insertions desired and you will have the total cost. This rate is so low that we connot charge classified accounts, and would, therefore, appreciate a remittance with order. No advertisement accepted for less than 50 cents.

REAL ESTATE

WILL EXCHANGE West Texas cattle ranch for unimproved or improved land in Florida. What have you? Give price and full particulars. T. E. Bartlett, 3410 McKinley Ave., ElPaso, Texas.

FIVE ACRES and a town lot, all for $700.00 Biggest bargain in Florida. Certain money maker. We want reliable salesmen to present this meritorious proposition to investors. Sumter Gardens and Bushnell Park lots. Every purchaser highly pleased. Florida Garden Land Company, Box 1759, St. Petersburg, Florida.

"BOOK OF TRUTH"
For planters of new groves
Is yours for the asking,
Write Today.
OCKLAWAHA NURSERIES INC.
"Pedigreed Citrus Trees"
Lake Jem, Florida

FOR SALE CHEAP—Eleven acres high, rooly citrus land; 4 acres cleared with small house, and large nice bearing orange trees full of fruit. Nicely located near Altamonte Springs, Fla. For particulars write H. A. Lunquire, 41 N. W. 29th St., Miami, Fla.

WANT TO SELL HALF INTEREST IN FIFTEEN ACRE SATSUMA BEARING GROVE ON HIGHWAY NEAR PANAMA CITY. ROBT. LAMBERT, OWNER. FOUNTAIN, FLA.

SATSUMA BUDWOOD from Bearing Trees. Hills Fruit Farm, Panama City, Fla.

For Sale—Pineapple land in winterless Florida. $15 an acre. Almont Ake. Venus Fla:

MISCELLANEOUS

ADVERTISING RESEARCH WANTED: Specialist in foods and nutrition, drugs, disinfectants, and insect control. Successful record in copy work and syndicate writing. Desire assignments in fruit products. Can introduce new facts and put new punch into educational advertising. Mrs Susa P. Moore, P. O. Box 523, Chicago.

FOR SALE—Dairy and stable manure, car lots. Link & Bagley, Box 464, Tampa Florida. 6t

WHITE WYANDOTT Cockrels, regal strain—the best in the country, direct from Martin pens. Utility and show birds $5.00 each; also eggs for hatching $5.00 per 15. W. A. King, Gen. Del., St. Petersburg, Florida.

REPOSSESSED player piano may be purchased for small unpaid balance by reliable parties on easy payments. We guarantee this player to be in excellent condition and a very unusual buy. Plenty of good rolls and bench included. M. L. Price Music Co., Tampa & Zack St., Tampa.

SOUTHDOWN SHEEP, White Rocks, Toulouse Geese, Guineas, Angora and Milk Goats, Circular free. Woodburn, Clifton, Va.

FOR SALE
Remington Portable Typewriter with standard keyboard. Has all advantages of larger machine. Ideal for farm and home use. $60. cash or sold on easy terms. Remington Typewriter Co., 103 Parker St., Tampa Florida

FARM—GROVE—HOME
22 acres large bearing grove; modern two-story, 8 room house, completely furnished on third largest lake in state in thriving town; good roads, church, school; complete line farm implements and tools. P. F. Cloonan, Yalaha, Lake County, Florida.

HIGH BLOOD PRESSURE easily, inexpensively overcome, without drugs. Send address. Dr. J. B. Stokes, Mohawk, Florida.

Laredo soy beans, considered free from nematode, excellent for hay and soil improvement. Write the Baldwin County Seed Growers Association, Loxley, Alabama, for prices.

MILLION Porto Rico Potato Plants, $2.50 1000. W. W. WILLIAMS, QUITMAN, GA

"A GOOD HAND LENS is necessary to produce good fruit. R. E. Lenfest, Winter Park carries a stock of the best and most practical for the convenience of growers. A good Lens saves spraying money. Write for prices."

FARMER AGENTS: Make $25.00 weekly selling Comet Sprayers. Profitable winter employment. You take orders. We deliver and collect. Commissions weekly. Established 35 years. Particulars free. Rusler Co., Box C-18, Johnstown, Ohio.

EARLY BEARING Papershell Pecan trees, budded or grafted and guaranteed. Great shortage this year. Write for catalog today. Bass Pecan Company, Lumberton, Miss

We Collect Notes, Accounts, Claims anywhere in world. No charges unless collected. We have collected in every State in Union, Canada and foreign countries. 25 years experience. MAY'S COLLECTION AGENCY, 28 Tinker Building Orlando, Fla.

Statement of the Ownership, Management, Circulation, Etc., Required by the Act of August 24, 1912, of The Citrus Industry, Published monthly at Tampa, Florida, for April 1, 1926.

State of Florida,
County of Hillsborough.

Before me a Notary Public, in and for the state and county aforesaid, personally appeared S. L. Frisbie, who, having been duly sworn according to law, deposes and says that he is the editor of The Citrus Industry, and that the following is, to, the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1—That the names and addresses of the publisher, editor, managing editor and business manager are:

Publisher, Associated Publications Corporation, Tampa, Florida.
Editor, S. L. Frisbie, Tampa, Fla.
Business Manager, S. L. Frisbie, Tampa, Fla.

2—That the owners are:

Associated Publications Corporation, Tampa, Fla.
S. L. Frisbie, Tampa, Fla.
S. Lloyd Frisbie, Tampa, Fla.
B. L. Gable, Tampa, Fla.
F. L. Skelly, Orlando, Fla.
Frank Kay Anderson, Winter Park, Fla.
B. C. Skinner, Dunedin, Fla.
F. P. Wall, Tampa, Fla.

3—That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities, are:

Mergenthaler Linotype Co., Brooklyn, N. Y.

S. L. FRISBIE, Editor

Sworn to and subscribed before me this 2nd day of April, 1926.

A. D. WILLIAMS.
Notary Public.